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Contractors and Engineers Monthly

Vol. 36, No. 1 JANUARY, 1939 $2 a Year, 20 Cents a Copy

Highlights Of This Issue

- **Better County Organization**
  Reorganization for an improved highway system and greater economy is the policy of Dutchess County, N. Y. Although the program has not been completed, improvements as a result of this reorganization have already been achieved in the work of both office and field units. How this county set out on its new program is told in an interview with the County Superintendent of Highways. See page 2.

- **They Just Waded In**
  A river suddenly on the rampage made the old saying "Through hell and high water" at least half true on Carlo Bianchi's concrete bridge job north of Bennington, Vt., last summer. The heavy rains and sudden rise in the river complicated matters a bit but both the paver and crawler shovel easily waded through high and low water and the job was successfully completed on schedule. See page 2.

- **County Moves Snow for State**
  In New York State, snow removal work on state highways is handled by the counties. Dutchess County, in its reorganization program, has developed an efficient system for handling this winter problem. See page 2.

- **Defeating Winter Snows**
  Widely different terrain, snowfalls varying from 400 to 33 inches, strong prevailing winds which constantly shift the snow, and bitterly cold weather are some of the problems which must be faced by Montana's state highway maintenance men during the winter months. Consideration of road design and location, properly placed snow fence, careful planning of work in advance, sturdy and well-maintained equipment, and a stout-hearted personnel are important factors in solving these problems. See page 7.

- **New Hampshire Cold Mix**
  A joint contract for grading and waterbound base courses and a cold-mix top for a new 3-mile heavy-traffic section of New Hampshire Route 101 east of Peterborough was completed last summer. See page 18.

Harmony

In an age where treaty repudiation is the order of the day, where compromise means "you go my way or else" and a difference of opinion may be a treasonable offense, it is encouraging to know that potential causes of disagreement and litigation are, in some occasions at least, settled intelligently and amicably around a conference table.

One of the most potent causes of litigation in the construction field—contract changes—and how such changes can be made satisfactorily to every one concerned is discussed in our Guest Editorial this month. *See page 4.*

Unreeling a 10-Ton Roll of 48-Inch Belt for the Grand Coulee Aggregate Conveyor

"Rubber Railway" At Grand Coulee

Conveyor System So Long That Belt Was Shipped in Eight 10-Ton Pieces; Can Handle 2,700 Tons an Hour

By HENRY W. YOUNG

(*Photo on page 36*)

✦ ONCE more history has been made at Grand Coulee, for the largest conveyor belt ever manufactured was turned out at the Akron plant of the Mechanical Rubber Goods Division of Goodyear Tire & Rubber Co. for use in conveying aggregate for the completion of Grand Coulee Dam in Washington. This giant belt was installed in July for the long run between the screening plant and the

(*Concluded on page 11*)

"Lost Time" Unknown As Slab Goes Down With Unusual Speed

(*Photo on page 36*)

✦ IN discussing ways of making a job click with O. C. McKinnie, Concrete Foreman for Barber Bros. on its 10.2-mile concrete paving contract from the Southwestern Louisiana Institute grounds in Lafayette to Maurice, La., the question of "lost time" arose. McKinnie recalled the days when a lot of Bureau of Public Roads investigators were snooping around jobs with stop watches and asking a lot of what he thought at the time were impertinent questions. One day one of the B.P.R. men told him at the end of the day that his paver had been held up for 1 hour and 21 minutes during the 10-hour day. He thought it an insult because "that skip had been hitting the road regularly all day." But he decided that those fellows knew what they were doing and the next day he sat on the mixer and watched. Sure enough, two batches were lost here, one a few minutes later, and a couple more in another 10 minutes, all because there was not a batch truck on the grade ready to dump a batch the instant the skip hit the ground. To this day every few working days he rides the paver and times every operation to be sure there are not a few seconds, not minutes, lost here and there. Once a batch is lost it can never be retrieved.

Preparing the Grade and Forms

The Lafayette-Maurice job contained considerable relocation and the old road crosses the new location in five places. The contract was awarded on a 320-working day schedule and paving started March 12, 1938. The job contains four bridges on creosoted piling with concrete caps, steel stringers and concrete decks varying from 50 to 60-foot spans. The same contractor handled the grading and drainage structures. The entire grading for the rough grade ahead of the forms was done with a Caterpillar 12-foot blade pulled by a Caterpillar Sixty gas tractor.

Where the grade was hard and high a Lakewood scarifier was put in to loosen the ground and then a team and fresno with two men were used to move the excess dirt from the grade. The trenches for the Blaw-Knox and Birmingham Fabricating Co. steel road forms were cut by hand, using some of the five grade men who worked both ahead of and between the forms. The forms were set by one form setter with a helper and then lined up by the fine grade crew. As soon as the forms were in, a Lakewood subgrader was pulled over them to cut the grade to within ½ inch of the final grade. After double checking with a crown board the grade was rolled with an Austin 5-ton Pup roller. All low places were brought up to grade and rerolled. The forms were all hand tamped although the contractor had a mechanical device on the job for tamping them.

Making and Delivering Dry Batches

The batching plant was located 1.4 miles from the north end of the road on a railroad siding close to the edge of Lafayette. A Lorain 60 with a 45-foot boom and a Blaw-Knox 1-yard heavy-duty Dreadnaught clamshell unloaded the sand, gravel and stone. The sand had to be unloaded to stockpiles before being used in the batches to insure a reasonably uniform moisture

(*Continued on page 16*)

Barber Bros. Makes Use of Time Others Lose Waiting For Batch Trucks on 10.2-Mile Job in Louisiana

COLD MIX SPREAD ON A WATERBOUND BASE

C. & E. M. Photo

Careful Adjustment of This Jaeger Spreader Insured Accurate Layers as John McCourt Co. Placed Two Courses of Plant-Mixed Material on John Iafolla's 3-Mile Paving Contract East of Peterborough, N. H. See Page 18.

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County Reorganization

Highway Department Units In Dutchess County, N. Y. Are Improved for Economy And Better Control

✦ LOCATED between the Hudson River on the west and the Connecticut State line on the east, Dutchess County, New York, occupies some 800 square miles of rolling country with 265 miles of county roads, all paved, in addition to state highways totalling 295 miles, and an extensive system of town roads. In a recent interview with Robert Frost Knox, County Superintendent of Highways, a very interesting picture of county highway department reorganization was presented. The reorganization is so rational that we feel it worthy of presentation here, even though it has not been in existence for a sufficiently long time to show its full value.

State and County Relations

In order to understand fully the value of the reorganization plan in Dutchess County, it is necessary to present a bit of the history of county road systems in New York State and the relationship between the state and the county regarding finances as well as snow removal. New York State created the county road systems in 1929, by Section 320 B of the state laws. The county superintendents were required to map the roads which were to be included in the new county systems. Prior to this time state funds for work within the counties had been used as county aid for town roads.

Immediately after Section 320 B was enacted, Dutchess County took over all the county-aid roads and the best of the town systems to form the new county road system. This relieved the towns of further responsibility for the maintenance of their major roads.

The funds for the operation of the Dutchess County Highway Department come from gas and vehicle taxes and a county tax levy. The money for construction and maintenance of highways, as well as bridges, comes from the returned monies from the state gas tax and vehicle fees. Money is still received by New York counties under the Lowman Act, which provided state aid for town highways. Dutchess County receives $40,000 from this source and matches the sum from its own tax levy. The total money received for county highway work is about $350,000 per year.

The County's Roads

Dutchess County's 265 miles of highways consist of 6.5 miles of old concrete roads, 109 miles of bituminous macadam, and about 35 miles of bituminous surface-treated roads. This latter

mileage is about equally divided between double applications and a thin macadam about 1¼ inches thick, using ¾-inch stone with a heavy cut-back asphalt applied at the rate of about ¾ gallon per square yard. Prior to the application of this thin macadam the road is primed with 0.25 to 0.33 gallon of the cut-back and then the stone is laid down with spreader boxes. The balance of the county roads consist of a telford base and a gravel top, providing a year-round dry surface. Because of the availability of rock and the thorough-going nature of the early road builders of the county a telford base was laid under all roads except the old concrete. The standard width of county roads is 16 feet, but in 1937 this was increased to 18 feet, which is the present standard, and all of the older roads will be widened to this width as right-of-way can be secured. All bases are laid the full 18-foot width.

The Reorganization

The reorganization of the County

(*Continued on page 8*)

All Snow Removal and Ice Control Done by County; Good Organization Keeps Roads Open All Winter

(*Photos on page 36*)

✦ IN New York State the state highway organization, known as the State Department of Public Works, does no snow removal from state highways, but has the work done by the counties, paying them up to $50.00 per mile per year. In the case of Dutchess County, arrangements are made for some towns to plow certain sections of state and county highways where the town plows are more strategically located for the work than the county department.

The money for snow removal on county highways is furnished by a regular budget appropriation amounting to about $40,000 from the county tax levy. This is augmented by the money received from the state for plowing state highways, but seldom is the amount received from that source sufficient to carry its proportionate burden of the total expense. If the $40,000 budgeted is not used, it can be held over to the next year. On the other hand, if more money is required, an emergency appropriation is made by the Board of Supervisors. The engineering offices of the County Highway Department are paid monthly salaries from the general tax levy of the county.

Equipment and Methods

The snow-fighting units consist of seventeen Frink V and large blade snow plows interchangeable on the same frame on the trucks and equipped with Frink hydraulic controls. The trucks are also built to carry the standard wings for topping off the plowed snow at the sides of the road. Four trucks have been re-rigged by moving the body back 18 inches to permit the relocation of the hydraulic units for handling the wings and the dumps. This location back of the cab is better than having

Hitting a Drift in Dutchess County

the hydraulic pistons for the wings mounted on a frame at the side where they are liable to be hit by frozen snow and damaged. These dump trucks are also used to restock the sandpiles. There are three Good Roads disc sanders for handling sand on icy pavements.

Sand for use on the sleet-covered or icy roads is stockpiled at strategic points throughout the county, using 35 pounds of calcium chloride per cubic yard of sand to prevent freezing of the stockpiles and also to increase the effectiveness of the sand on the roads.

As mentioned before, New York State counties plow all state roads, take care of the sanding and place the snow fence and in return are paid by the State one-half the cost of snow removal up to $50.00 per mile per year. In 1937 a total of 295 miles of state highway in Dutchess County was cleared of snow for the state by the county forces, in addition to the 253 miles of county road which were plowed.

In the garage, as well as in the main office, a 3 x 6-foot map of the county shows all roads which are plowed and who handles the plowing on each section. This is indicated by colored lines readily identified at a distance. As a storm develops, the County Superintendent of Highways, the head of the construction unit and the head of the maintenance unit work in shifts at the county highway offices and act as supervisors to distribute the plowing equipment, assisted by two men from the engineering staff as dispatchers. Each plow has a definite route to follow and definite points from which its operator telephones back to the county offices to report its progress. Progress for each storm is charted on the map and repeated trips over a given road are shown by an increasing number of parallel lines beside the road. In this way, the history of the plowing of each road, whether by county or town equipment, is preserved on a map and can be filed for reference and for use in planning future snow removal work.

New Concrete Bridge Over Vermont River

(*Photo on page 36*)

Carlo Bianchi & Co., Inc., Completes Gravel Fills And Abutments for Bridge At Bennington, Vt.

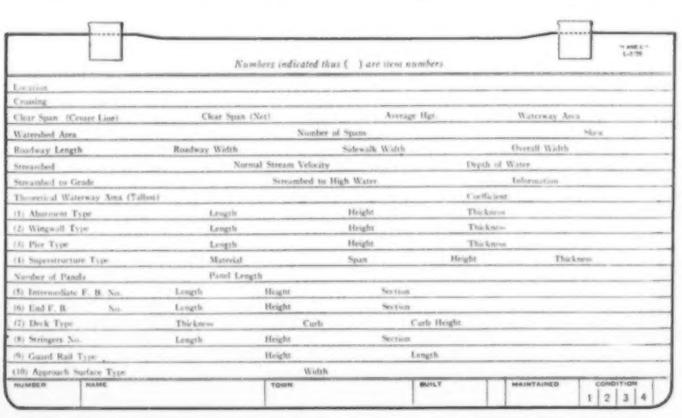
✦ BRIDGING the Roaring Branch of the Walloomsac River north of Bennington, Vermont, would be an easy job in normal summer weather because the stream bed is practically dry, permitting equipment to drive across easily. During the second week of July, 1938, the continuous heavy rains in the watershed of this flashy stream sent the water up to 3 feet and more in depth, rolled heavy stones into every sump and tangled pump suctions and pumps with grass and twigs. In three days the stream was normal again.

Approach Fills

Fortunately most of the work on the gravel approach fills had been completed before the heavy rains, for the gravel was all taken from the stream itself at the site of the bridge. The contractor's 1½-yard Bucyrus-Erie diesel 37B equipped with an Amsco manganese steel bucket walked right out into the stream bed and loaded truck after truck with excellent fill material for the north and south approaches. Eight hired trucks were used for the work.

The south approach fill was done first and then the north. All the material was dumped by the trucks and then spread with an Allis-Chalmers tractor and Baker bulldozer with no rolling. The material was wet when delivered from

(*Concluded on page 20*)



Numbers indicated thus ( ) are item numbers

Location						
Crossing						
Clear Span (Center Line)	Clear Span (Net)		Average Hgt.		Waterway Area	
Watershed Area		Number of Spans			Skew	
Roadway Length	Roadway Width		Sidewalk Width		Overall Width	
Streambed	Normal Stream Velocity			Depth of Water		
Streambed to Grade	Streambed to High Water			Information		
Theoretical Waterway Area (Talbot)				Coefficient		
(1) Abutment Type	Length		Height	Thickness		
(2) Wingwall Type	Length		Height	Thickness		
(3) Pier Type	Length		Height	Thickness		
(4) Superstructure Type	Material		Span	Height	Thickness	
Number of Panels	Panel Length					
(5) Intermediate F. B. No.	Length	Height	Section			
(6) End F. B. No.	Length	Height	Section			
(7) Deck Type	Thickness	Curb	Curb Height			
(8) Stringers No.	Length	Height	Section			
(9) Guard Rail Type		Height	Length			
(10) Approach Surface Type		Width				

NUMBER	NAME	TOWN	BUILT	MAINTAINED	CONDITION 1 2 3 4

One of Dutchess County's Bridge Inventory Cards. On the Reverse Side Is Space for a Record of Inspections of the Numbered Items Appearing Above Plus No. 11, "Signs," with Remarks, the Condition of Each Item Being Indicated by Numbers. 1=Excellent, 2=Good, 3=Fair and 4=Bad. There Is Also Space for Recording the Slight Distances, Restrictions, Computed Safe Loads, and Posting, and a Column for the Painting Record

C. & E. M. Photo

A Bucket Elevator Was Cast in the Role Usually Played by a Crane and Clam, Feeding the Batcher on Bianchi's Bennington Bridge Job

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Can Contract Changes Be Met Harmoniously?

By ROY B. WILLIAMS,

Assistant Commissioner, U. S. Bureau of Reclamation

Some difficult problems in practical procedure are encountered as the construction of the large complex reclamation projects in the West continues to involve larger and still larger dams. No matter how expert and painstakingly careful the designing staff, during the construction of many big jobs the time eventually comes when unforeseeable conditions arise and it becomes necessary to depart from the original drawings.

During the early history of the Bureau of Reclamation, these changes in plans were easily accomplished for two reasons: the structures then were generally simpler and the corrections to meet emerging needs relatively easy to make; and all of the Bureau's construction was done by Government forces. For many years, however, it has been the policy of the Bureau of Reclamation to let its work to contract. Now only a very few jobs are done on a day-labor basis, and these only when for reasons peculiar to the financial plans or to the job itself the contract system is not applicable.

The introduction of the contract system has increased many fold the difficulty of making the changes in the designs which become necessary as work progresses. The execution of a contract, which includes a copy of plans and specifications upon which the contractor's estimates were based but which are drawn up in advance of the start of the work, necessarily introduces inflexibility. Elaborate machinery may be set up in anticipation of possible changes to come, but the fact remains that an equitable settlement still must be made with the contractor when the emergency finally arises. This is not an argument against the contract system, but a discussion of one of its difficulties. It is true that some have used this point as an argument against the system, but the Bureau of Reclamation is convinced that this difficulty is not insuperable and that advantages gained elsewhere swing the balance strongly in favor of the contract system.

In spite of extensive borings, testing, and other investigations made prior to construction at a dam site, for example, the conditions which actually will be encountered can not always be accurately determined in advance, and material changes from the original plans are sometimes necessary. This is especially true in the construction of a large dam, where more than ordinary precautions must be taken to insure the safety and stability of the completed work.

"The Subcontractor Wanted to Settle Things This Way"

These necessary changes in plans complicate the construction under contracts. In such cases the negotiation and issuance of an Order for Changes revising the contract becomes necessary. A major change is often of much concern to the contractor since it may disrupt his construction program or introduce delays or other factors affecting the program of his work. The Bureau engineers are also vitally concerned since they are charged with the responsibility of protecting the Government's interests and of seeing to it that the work is satisfactorily and expeditiously performed at reasonable cost.

Great care is therefore necessary in deciding on the extent of the changes and the methods to be employed in carrying them out. When it becomes apparent that changes materially affecting the work are advisable, a Board of Consulting Engineers is ordinarily convened at the site to consider the matter in consultation with members of the Bureau's designing and construction staff. When the extent of the change has been decided on, informal negotiations between the representatives of the contractor and the Bureau are carried on in an endeavor to arrive at an agreement satisfactory to both parties. These negotiations start with conferences between the Bureau's construction or resident engineer and the contractor's superintendent. These men are located on the project and are directly familiar with the work involved and are usually able to arrive at some tentative understanding with respect to most of the items involved. The matter is then considered further by the contractor and the Chief Engineer of the Bureau at conferences or in exchange of correspondence or both until an agreement has been reached which is satisfactory to both parties. A formal Order for Changes is then prepared and issued to the contractor over the signature of the contracting officer. The order for changes definitely sets out the work to be performed and the method of payment. If satisfactory to the contractor, the order is then signed by him, after which it is forwarded through regular channels for approval by the Commissioner and by the Secretary of the Interior, and thus becomes a definite part of the contract.

On the whole, the Bureau of Reclamation has found its contractors reasonable when Orders for Changes have become necessary. In very few instances has litigation resulted. It should be a great satisfaction to both the engineers and the contractors that experience during recent years has demonstrated that problems of this nature can be solved with fairness to both sides and without the need of expensive litigation through sympathetic understanding on the part of each of the other's difficulties.

Letters to the Editor

Highway Engrs. Agree With Petty on Detours

To the Editor
CONTRACTORS AND ENGINEERS MONTHLY

This Department concurs almost entirely with the statements made by Professor Ben H. Petty in his editorial "Who Pays for Detours?" in the November issue of CONTRACTORS AND ENGINEERS MONTHLY.

Where long or short detours are necessary in reconstructing Nevada highways, the surface and width of such detour roads conform very closely to the surface and width of the main highway. In other words, this Department requires the construction of a sufficient thickness of base and surface to carry the loads required, and the surface is oiled. Where it is not feasible to construct detours, the contractor is required to carry traffic through construction, the roadway is watered sufficiently to eliminate dust hazards, and every provision possible is made to carry travel with the least possible discomfort.

As the traveling public pays the construction and maintenance costs of the Highway Department in this state, we feel that they are entitled to every consideration.

Sincerely yours,
Robert A. Allen,
State Highway Engineer,
Nevada Department of Highways
Carson City, Nevada
December, 1938

To the Editor
CONTRACTORS AND ENGINEERS MONTHLY

The State Highway Commission of Wisconsin is in substantial accord with the policies outlined by Professor Petty in his editorial in the November issue of CONTRACTORS AND ENGINEERS MONTHLY. Substantial sums are spent for conditioning and maintaining secondary roads prior to their utilization as detours and, in all cases, attempts are made to turn the road back to the local unit of government in as good or better condition than existed before it was used as a detour.

Naturally the standard to which a local road can be reconditioned is relative, and while we would be the last to claim that our detour situation is always ideal, we believe that the objective pointed out by Professor Petty is the one we are shooting at.

Very truly yours,
E. L. Roettiger,
State Highway Engineer,
Wisconsin Highway Commission
Madison, Wis.
December, 1938

Public Appreciates Detour Explanations

To the Editor
CONTRACTORS AND ENGINEERS MONTHLY

This Department agrees with Professor Petty's ideas on detours to the extent that ample consideration must be given to the type of detour provided. It is the policy of our Department to do a light grading job with a blade grader, make minor and temporary improvements on drainage structures such as widening. Except in rare cases, all detours are surfaced with gravel, and always adequately marked before they are put into use. In a number of cases where detours are required for short projects, we lease ground alongside and parallel to the project for use as a detour. We believe such a location for a detour is highly desirable psychologically as it produces a favorable reaction from those who must use it, since they are able to see what is going on, become interested in the work, and are personally able to verify the necessity for a detour. Therefore, even though its condition is not the best, they are less likely to become irritated by the need for using a detour.

All detours are given the same regular maintenance when in use as regular routes. The cost of preparing a detour generally varies from $500 to $1,000 a mile, with the maintenance cost varying from $250 to $400 a mile per year.

I might add that we give particular attention to the marking of detours in order that they can be easily followed. The marking includes, in addition to regular route markers and standard warning signs, the use of special signs at the beginning and end of detours, indicating why the detour is necessary and giving information regarding the number of miles to distant towns. As a whole, we give detours the same maintenance and attention as regularly used highways and reasonable consideration to their preparation.

Very truly yours,
F. H. Klietsch,
Maintenance Engineer,
Department of Roads and Irrigation
Lincoln, Nebraska
December, 1938

New Chinese Highways

Fourteen trunk highways, totaling approximately 8,709 miles, were opened up in the interior of China during the first year of hostilities, according to the Ministry of Communications. The system of highways thus developed connects ten provinces in Central, West and Southwest China. These trunk lines and many branch lines are being used increasingly for commercial and government transportation.

The expenditure of $500 per mile per thousand vehicles per day for snow plowing was shown to be justified in a paper presented at the 1938 Highway Research Board meeting.

Construction in 1939

Expenditures for public works showed a decline in 1937 and 1938 but a new public works program is now being put into effect. Under this program, approximately $200,000,000 has been earmarked for Federal projects and $906,000,000 for non-Federal projects, the total cost of which will be at least $1,478,000,000. It is required that these projects be started as soon as possible, must be under contract by January 1, 1939, and must be substantially completed by July 1, 1940. An analysis of these projects by the American Institute of Steel Construction indicates that they will require at least 1,000,000 tons of fabricated structural steel. From this volume, the work ahead for 1939 should approximate 750,000 tons of steel.

Public construction would normally account for but a small part of the total business of the fabricated structural steel industry but in the last few years it has at times accounted for as much as two-fifths of the total business.

One of the Battery of Sodium Vapor Lights Illuminating the New Blue Water International Bridge Between U. S. and Canada

International Bridge Lighted by New Units

Sodium Vapor Lights Illuminate Blue Water International Bridge Between U. S. and Canada

✦ WHAT—cannons on the U. S.-Canada border? Yes, but these are cannons of peace and good will, for, according to Westinghouse lighting engineers, the new luminaires lighting the Blue Water International Bridge from Port Huron to Sarnia, Ontario, are really electron cannons. Electrons, the invisible building blocks of electricity, are fired through the sodium vapor, squeezing the atoms of the sodium gas, and the resultant commotion produces, not war, but energy in the form of soft yellow light.

The lamps used on this bridge are rated at 10,000 lumens and it is reported that objects on the roadway of the bridge illuminated in silhouette are visible 2,000 feet ahead of the motorist. Glare is eliminated by the use of highly polished aluminum reflectors which direct the light downward in a useful path along the road surface.

This bridge, which is 7,200 feet long, 160 feet high and cost approximately $3,900,000, was built by agreement between the United States and Canada, Michigan and Ontario, and the State Bridge Commission of Michigan. The opening of the bridge to motor traffic shortens the driving distance from Chicago to Niagara Falls by approximately 30 miles and reduces the distance from Detroit to the Falls from 280 to 251.5 miles.

1937-38 Road Work Exceeded Average

Over 15,000 miles of highways were improved during the past fiscal year in the program administered by the U. S. Bureau of Public Roads, according to its annual report. In addition it supervised the elimination of 711 grade crossings, the reconstruction of 144 obsolete grade-crossing structures, and the protection of 744 crossings with signs and signals. Both the amount of work done per mile of improvement, and the total mileage improved, considerably exceeded the average for the past 10 years.

The greater portion of the work was done in cooperation with state highway departments, accounting for 12,129 miles of highway improvement. This work included 9,333 miles of rural portions of the Federal-Aid highway system, 559 miles of municipal portions of the F-A system, 201 miles of secondary roads in municipalities, and 2,036 miles of rural secondary roads. Classified according to type of construction, the year's work in cooperation with the states consisted of 1,506 miles of graded and drained roads; 4,998 miles of treated and untreated sand-clay, gravel, and macadam; 1,989 miles of low-cost bituminous mix; 213 miles of bituminous macadam; 419 miles of bituminous concrete; 2,870 miles of portland cement concrete; and 134 miles of bridges, grade separations, and miscellaneous types.

The elimination of the hazards to life at railroad grade crossings was an important contribution to highway safety. In addition to the protection of life and property, grade separations effect considerable savings in time and trouble to the traveling public, according to the report. More than half of the expenditures during the year for this class of work was in municipalities, reflecting the relatively greater danger and delays at city and suburban crossings.

The year saw the near completion of the emergency program of road construction, and was marked by the initiation of Federal Aid for secondary and farm-to-market road construction and the extension of outright Federal grants for highway-railroad grade crossing elimination as parts of the regular Federal highway program.

During the year the Bureau supervised road construction in national parks, national forests, the reconstruction of flood-damaged roads, and roads financed with funds allotted by the PWA and the WPA. Work in this class amounted to 3,215 miles.

The importance of proper lubrication can not be stressed too often. If you have any special lubrication problems, write the Editor.

Tar and Asphalt Kettles

A new circular describing White oil-burning tar and asphalt kettles has recently been issued by the White Mfg. Co., Elkhart, Ind. Copies of this Circular No. 27-B, which contains descriptions and illustrations of the various models, may be secured by interested contractors and state and county highway engineers from the manufacturer.

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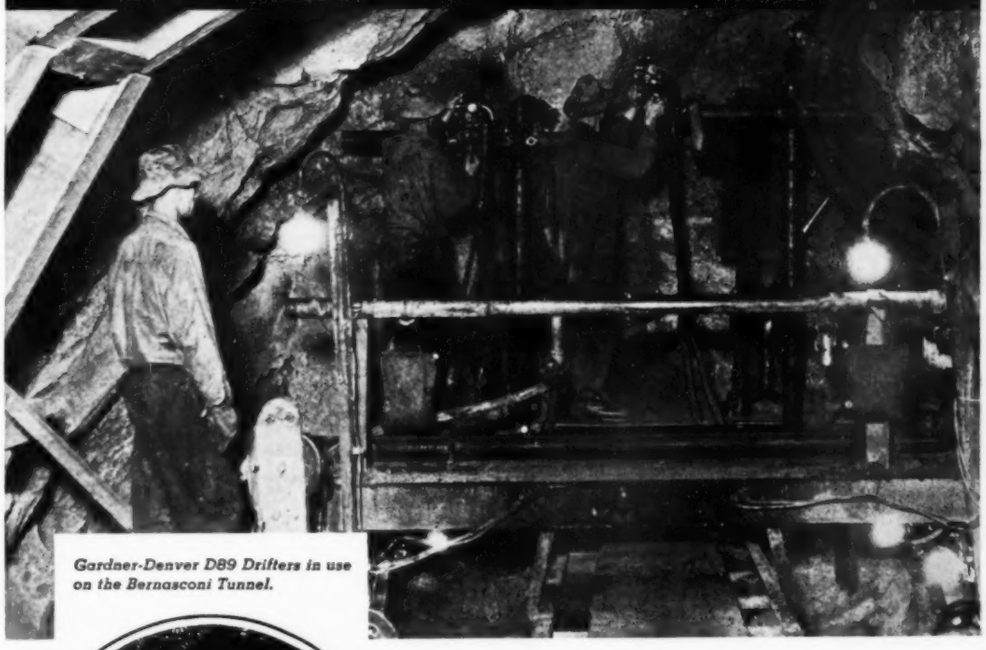
DIESEL GASOLINE STEAM ELECTRIC

ANOTHER PROVING GROUND FOR GARDNER-DENVER
PERFORMANCE
THE COLORADO RIVER AQUEDUCT



Gardner-Denver D89 Drifters in use on the Bernasconi Tunnel.

★ "Public Project No. 1"—the Colorado River Aqueduct—has been another proving ground for Gardner-Denver *performance*—the kind of performance that's needed wherever schedules must be kept and costs reduced. Here—as on many other large projects—Gardner-Denver Air Compressors, Rock Drills and Drill Steel Sharpeners have played an important part. Gardner-Denver equipment was used on many of the most important, as well as the most difficult, parts of the aqueduct construction. For rapid progress and for economy, it will pay YOU to standardize on Gardner-Denver! Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER Since 1859

Improved Time Book Free to Contractors

An improved time book embodying a complete office, field and Social Security wage record, has been announced by the Universal Atlas Cement Co., 135 E. 42nd St., New York City. Free copies of this new 48-page Time Book will be sent on request by Universal Atlas to those readers mentioning this item.

The book has all the information a contractor needs to keep his time and wage records and Social Security data as to taxes, tax deductions and tax exemptions. It is good for field or office use, fills the need of both large and small contractors and is adaptable to any system used by the contractor. The pay day and pay interval can be according to any contractor's present practice. Either weekly or continuous time records may be kept without rewriting names of employees.

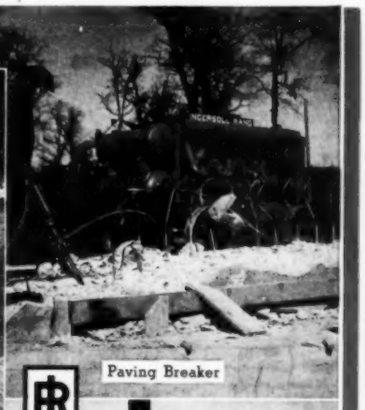
Pumps for Heavy Duty

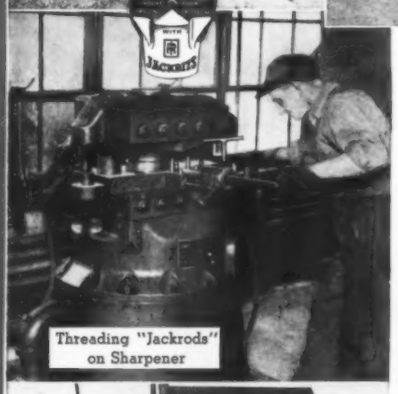
Humdinger self-priming centrifugal pumps which are designed for heavy-duty service such as unwatering cofferdams, pier holes, caissons, foundations, bridge footings, for furnishing water for sand and gravel washing, road construction, for sump pumping, etc., in a variety of models and sizes to meet the requirements of such service, are described and illustrated in a 16-page bulletin issued by the Ralph B. Carter Co., 53 Park Place, New York City. This bulletin not only shows the various Humdinger models, including vertical caisson pumps, high-pressure jetting pumps, diaphragm and plunger pumps, but also contains job photographs showing these pumps on a variety of jobs.

Copies of this Bulletin No. 1040 may be secured direct from the manufacturer by mentioning this item or from this magazine.

"Jackhamer" Drills

I-R Portable Compressor and Air Tools on a short-time job


Paving Breaker

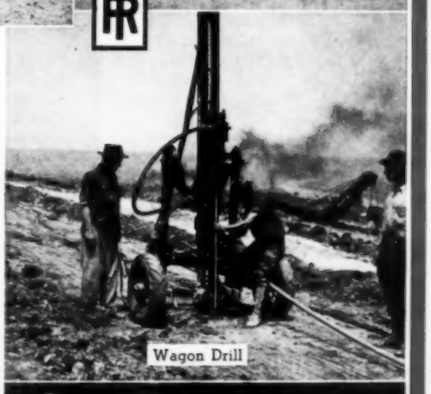

Threading "Jackroda" on Sharpener

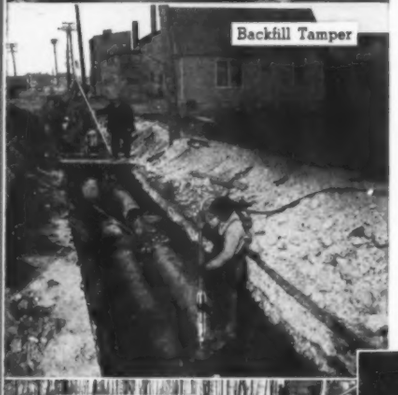
Save Time and Money *with Reliable Equipment*

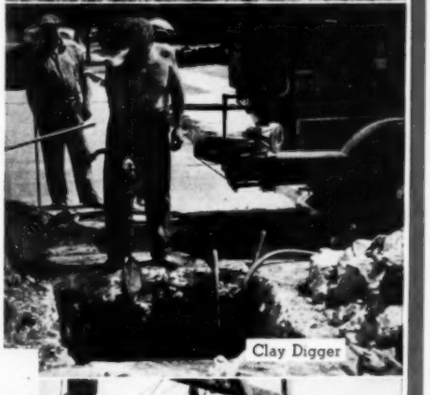
AN investment in modern and reliable I-R machines, such as the new Two-Stage Air-Cooled Portable Compressor, is your best insurance against losses due to delays caused by breakdowns. These new machines will also enable you to make substantial savings in operation and upkeep costs.

The I-R line of labor-aiding air-tools is complete. It includes Rock Drills, all kinds of Pneumatic Tools, Hoists, Pumps, and many others in addition to those shown on this page.

Our nearest representative can give you definite information regarding the savings our equipment will help you make.


Wagon Drill


Backfill Tamper


Clay Digger

Concrete Vibrator

Two-Stage Air-Cooled Portable Compressors on a large construction job

Air Hoist

Other I-R Products include: Stationary Compressors, Diesel and Gas Engines, Pumps, Condensers, Refrigerating Units.

Atlanta, Birmingham, Boston, Buffalo, Butte, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Duluth, El Paso, Hartford, Houston, Kansas City, Knoxville, Los Angeles, Newark, New York, Philadelphia, Picher, Pittsburgh, Pottsville, Salt Lake City, San Francisco, Scranton, Seattle, St. Louis, Tulsa, Washington

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Montana Plans Carefully To Defeat Winter Snows

Road Design and Location Considered Before Snow Fence and Equipment Are Placed Ready for Winter

By SCOTT P. HART, Maintenance Engineer, Montana Highway Commission

(*Photo on page 36*)

✦ THE network of the Montana state highway system traverses an area extending 550 miles from east to west, and 280 miles from north to south, an area larger than the New England states, New York state, and New Jersey combined. The terrain which is covered varies from the protected valleys in the favored parts of the state and the wind-swept plateaus of the central area, to the high and rugged mountain passes of western Montana.

With the exception of 200 miles of roadway which are comparatively unimportant insofar as winter traffic is concerned, the entire state system of highways is kept free of snow and in safe condition for travel at all times during the winter period.

The normal snowfall experienced over the state each season varies from 400 inches at Lookout Pass on the Montana-Idaho state line upon U. S. Highway No. 10 to 33 inches in the eastern part of the state. Due to the continued cold weather which is usually experienced throughout the winter, this snow, while shrinking in volume, remains upon the ground to be shifted by prevailing winds, constituting an everpresent threat to traffic conditions. Consequently, the handling of the snow problem is one of the major activities of the Maintenance Division of the Montana Highway Department. The funds spent for this purpose total about $170,000 each year, an expenditure which is justified by the increasingly heavy volume of winter traffic upon the highways.

Before discussing the plan of organization which has been developed for meeting the challenge of winter weather conditions, the snow removal equipment used, and the methods followed, a word is in order with reference to the careful attention which must be paid to highway location and design if later snow problems are to be held to a minimum.

Proper Design Prevents Drifts

It has been our experience in Montana that the road should be so located that it is exposed to the winter sun, that it follow those slopes where the prevailing winds will tend to sweep the roadway clear of snow, and that every advantage be taken, where feasible, of protective topography which will serve to trap and impound drifted snow before it reaches the road surface. With reference to design, we find that the grade line, when possible, should be held from 1½ to 2 feet above the ground elevation upon either side, that it should be rolled within reasonable limits so that long and shallow cuts may be unnecessary, and that the side ditches in those cuts which can not be avoided should be both wide and deep to serve as reservoirs for snow that drifts into the cuts from adjacent areas as well as for that which is ploughed from the roadway.

Montana, during the past few years, has had occasion to reconstruct a considerable part of its mileage to modern standards. A comparative study of the work involved in keeping a given stretch of roadway free of snow, before and after reconstruction, shows conclusively that where the features discussed above have been incorporated into the new project the snow problems are two-thirds whipped.

Use of Snow Barriers

In those cases where other protective measures will not suffice, we find it necessary to erect snow fence. This is particularly true of the untimbered central and eastern portions of the state where the worst drifting conditions are experienced. The plans for all new projects therefore call for snow fence where needed. At the present time we have 320 miles of snow fence in use. As the older "grass roots" projects are reconstructed, the amount of snow fence which we will find necessary to keep in place, and to maintain, will be decreased.

The Montana Highway Department specifications call for a 4-foot fence of the woven wire-wood slat type, attached to steel posts which are set at 10-foot intervals. Stability is obtained by guy wires extending at right angles to the fence from alternate posts, together with a 1 x 4-inch stiffener of wood which is securely wired to the upper portion of the fence.

The snow fence is set back 30 feet or more from the roadway which it is to protect, varying with the incline, if any, of the intervening ground and with the velocity of the wind which is to be anticipated. These factors determine also whether the fence will rest directly upon the ground, or whether it will be so lashed to the supporting posts that the bottom of the fence will be from 8 to 10 inches above the ground.

In those instances where unusually severe drifting conditions are encountered, the situation is met by the erection of parallel lines of the standard snow fence, or by the use of the "double-deck" fence. This consists simply of two sections of the regular 4-foot fence, erected one above the other, and attached to heavy corral posts which are set firmly into the ground. Guy wires and stiffen-

(*Continued on page 22*)

A Truck-Mounted V-Plow and Snow Wing And Its Two Sturdy Operators Clear a Stretch of Montana Highway

Production
125 Yds. per Hr.
Fuel Cost
18¢ per Hr.
LORAIN
CENTER DRIVE DESIGN
makes possible big yardage because it gives direct-to-the-point power application; enables full power of engine to be concentrated on any one operation; permits a simplified construction using fewer and stronger parts.
DIESEL POWER
as supplied by the famous Caterpillar D4600 engine, assures rock-bottom fuel costs for all operations plus greater lugging power for the tough digging jobs.
• And the Lorain-40 is the only ¾-yd. shovel or crane which can give you these two outstanding features in combination. If you want the increased production of Center Drive design plus the fuel economy of Caterpillar Diesel power, write today for catalog and performance data on the ¾-yd. Lorain-40.
UNIVERSAL CRANE DIVISION • THE THEW SHOVEL CO.
LORAIN, OHIO
THEW CENTER DRIVE
¾ YD LORAIN-40

Efficiency in Road Work Gained by Reorganization

(*Continued from page 2*)

Highway Department began in January 1938 with the County Superintendent of Highways as the executive head of the Department and six units operating under and responsible to him. These units are (1) construction, (2) maintenance, (3) highway surveys and design, (4) bridge design, construction and maintenance, (5) office, accounting and management, (6) garage, yard and shop.

Construction, Maintenance, Surveys

The construction unit consists of four regular gangs of five or more men, plus additional local seasonal labor as required. Two of these regular gangs are specialized in penetration macadam. There are also ten other miscellaneous gangs composed chiefly of WPA workers and town forces working on sub-base and gravel construction and some labor which works seasonally on farms and on the roads. For the last four or five years this type of work has been done exclusively by force account because of the large amount of WPA labor employed.

There are five cruising maintenance crews, composed of six to twelve men each, who work on the ditches and also do the actual repair work on the roads, using an asphaltic cold patch. Most of the bituminous macadam roads have been built since 1930 and all of the heavy surface treatments have been applied since that time. Consequently, up to 1938 there was very little maintenance required, but it is now becoming a major problem. Within the maintenance unit it is planned to organize patrol or section maintenance crews scattered throughout the county. The regular maintenance and macadam crews were worked on surface treatment as maintenance projects this year from May 1 to July 1, when this type of work was completed. This minor construction under the head of maintenance was necessary because of the urgent need of intensive maintenance due to delays in regular required maintenance.

The county maintains two survey parties and three drafting and design groups.

The Bridge Unit

The work of bridge design, construction and maintenance is handled by the bridge unit in charge of one engineer with two assistant engineers who make use of one of the highway survey parties as required. The county maintains one regular bridge construction unit which builds all county bridges up to 35-foot span in which concrete and rolled steel sections are used. Larger bridges are built by contract. It is regrettable to note that the hurricane of September 21, 1938, caused so much damage to bridges in Dutchess County that the supervisors were required to make an emergency appropriation of $300,000.

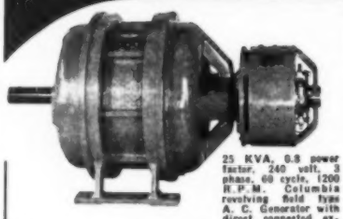
There are over six hundred bridges in the county and town highway systems. The county handles the construction of all county bridges from 5-foot span up. It handles the annual inspection of all bridges on town roads and the construction and maintenance of all town bridges of 25 feet or longer when it is necessary to replace existing old structures.

Based on the excellent system of the Ohio Department of Highways, a thorough inventory of all county and town bridges within its borders has been started by Dutchess County. A complete report is made on a card, reproduced on page 2, and on the county map red, black and blue dots supplemented by colored pins indicate the size, type and conditions of the structure. The red is used to indicate a bridge on the county road system or one on the town highway system which has been taken over by the county for reconstruction and is now maintained by the county; a black dot designates a bridge on a town highway, the span of which is 25 feet or more and will, therefore, ultimately be taken over by the county for reconstruction and maintenance, but is at the present time under the jurisdiction of the Town Superintendent; and a blue dot locates a town bridge having a span between 5 and 25 feet located on the town highway, now maintained by the town and one which will be reconstructed, if necessary, and maintained in the future as a town bridge. The county's only interest in this latter type is its annual inspection and recommendations for reconstruction or maintenance by town forces.

A system of four colors of round-headed pins, inserted in the centers of the location dots, is used to classify the present condition of each bridge. A blue pin indicates a bridge of adequate strength and width for the use of the traffic normally traveling the highway on which it is located. A green pin is used to indicate a bridge of adequate strength but too narrow for other than one-way traffic. A yellow pin indicates a bridge that has two-way width but insufficient strength and therefore requires a limited-load marking. A one-

(*Continued on page 26*)

COLUMBIA A. C. GENERATORS



25 KVA, 0.8 power factor, 240 volt, 3 phase, 60 cycle, 1200 R.P.M. Columbia revolving field type A. C. Generator with direct connected exciter.

SIZES: 1 TO 156 KVA.
SPEEDS: 1800, 1200, 900, 720, 600, 450 R.P.M.
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COLUMBIA GENERATORS ARE DESIGNED FOR ADAPTATION TO ENGINE MANUFACTURERS' MOUNTINGS. SEND US YOUR BLUEPRINTS FOR QUOTATIONS.
LIBERAL RESALE PLAN TO DEALERS AND ENGINE MANUFACTURERS.

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LONG REACH HIGH LIFT

High lift and long reach cut excavating costs with Koehring Shovels. . . . The Koehring independent and positive crowding action spots the dipper beyond and above the end of the boom or wherever it may be desired. . . . This 5/8 yard Koehring Shovel is operating in a brick plant where high lift and long reach are essential for maximum production.

KOEHRING COMPANY
CONSTRUCTION EQUIPMENT • MILWAUKEE, WISCONSIN

Effective Traffic Aids For Night Road Users

A new bulletin which is bound to impress those responsible for the safety marking of highways for night use has been prepared by Prismo Safety Corp., Division of John R. Wald Co., Huntingdon, Pa., on Prismo reflecting products. The striking night photographs show barriers, guard rail posts, and center lines treated with Prismo process which produces a brilliant reflected light from motor traffic headlights at night. Copies of this Bulletin No. 2 may be secured direct from Prismo by mentioning this item.

Barber Asphalt Moves Offices to Perth Amboy

The Barber Asphalt Corp. has completed the construction of additional office building space, with added equipment, providing for the removal of the general offices from Philadelphia to the plant at Barber, New Jersey. The new addition is to the building fronting State Street in Barber, located on the Central Railroad of New Jersey in the northern limits of Perth Amboy. Removal of the administrative offices from Philadelphia where they have been located for the last twenty-five years is in the interest of efficiency and economy. James E. Auten, President, in announcing the removal said: "Our administrative and plant facilities have been separated for many years and there was no good reason for this practice. Absentee management does not make for efficient conduct of manufacturing operation. This move means that we are all to become a part of the Barber community and that management and operation are to be more closely coordinated."

McGredy, P & H Manager Of Washington Office

R. H. McGredy, for many years a sales executive of the Harnischfeger Corp., Milwaukee, Wis., has been appointed Manager of the Washington office where he will direct the sales of P & H overhead traveling cranes, electric arc welders, excavators, hoists, and electric motors. His address is RFD No. 1, Alexandria, Va.

YOU SAVE WORK FOR IT . . . AND IT

SAVES MONEY FOR YOU

No matter what road work you hand a "Caterpillar" Diesel Tractor—pulling a grader, lugging a ripper, hauling a scraper, or towing a wagon—you get the *same* type of fuel-economy, power, and sure-footed traction!

In fact, the efficiency, versatility and economy of this machine are so worth while that you're apt to reach the point where you save up all your jobs for it!

And that, after all, is the wise thing to do. For a "Caterpillar" Diesel Tractor can pay for itself from *two* different angles. The first day you put it to work, it starts to *wipe out* its purchase-price through savings on fuel . . . and savings on maintenance!

But in order to speed up the process, you can let it handle a variety of duties—and *save* you the added expense of buying, operating and maintaining specialized equipment that works only part-time!

A few of the ways that can be done are shown in these pictures. Look them over. Study them carefully. And notice the fuel-economies and maintenance-savings these counties get with "Caterpillar" Diesels!

← Doniphan County, Kansas, hooks its "Caterpillar" Diesel D7 Tractor onto a LaPlant-Choate C-5 rear-dump scraper and puts the outfit to straightening, cutting and filling. Working 8 hours a day, fuel costs only $1.60 . . . 2½ gallons an hour, at 8c a gallon!

↑ This tractor, owned by Early County, Georgia, has done a lot of hard work . . . 10,000 hours of it! But through proper lubrication and care, Early County finds that repairs cost only 10c an hour! To help build this farm-to-market road, the tractor pulls a 6-yard LeTourneau scraper and uses only 2½ gallons of Diesel fuel an hour. Tough red clay here. But 40½ cubic yards are being moved every hour on a 750-foot haul!

↑ Highway rebuilding in Upson County, Ga. This "Caterpillar" Diesel D7 Tractor uses only 2½ gallons of 9-cent fuel an hour, as it lugs a Killefer ripper so the scrapers can come in. This county, in one year, has saved $3500 through "Caterpillar" Diesel power. There's a tip for other counties—and contractors!

↑ "Caterpillar" Diesel D7 Tractor and a No. 66 "Caterpillar" Grader pulling ditches and shoulders for Geneva County, Alabama. Only 2 3/10 gallons of 9-cent fuel an hour needed! Geneva County respects "Caterpillar" Diesels! Here's a line-up of its equipment: 3 tractors, 3 blade graders, and 2 "Caterpillar" Diesel Auto Patrols!

CATERPILLAR

TRACTOR CO., PEORIA, ILLINOIS

DIESEL ENGINES • TRACK-TYPE TRACTORS • ROAD MACHINERY

Native Workers for the Natal, South Africa, Provincial Roads Department Using a Sullivan Rock Drill. In Contrast to the Home-Made Burlap Suits of the "Boys" Is the Old Aviator's Helmet Proudly Worn by the Operator On the Right

Tandem Scrapers Speed Grading Job

(*Photo on page 36*)

California is handling the grading for its new roads at double-quick time. In the construction of the Galican Overhead project which involves realigning and rebuilding 2½ miles of State Highway 101 between Santa Ana and San Juan Capistrano, Crow Brothers Construction Co. of Los Angeles used tandem scrapers to speed the work. Four RD8's pulling tandem 12-yard Carryalls easily moved 55,000 pay yards of dirt over a 600-foot haul in 10 working days of 8 hours each. A 12-inch extension on the aprons of the Le Tourneau scrapers increased the payloads one yard. The total yardage on the project was 120,000.

The illustration is an excellent panorama of the cut and fill on this job. Two heaping tandem loads are being hauled down the cut to the fill, which is being tamped and rolled by a sheepsfoot roller. Two more tandem outfits are seen working on the far side of the fill. The old road, contrasting with the new, wide grade, is seen on the right in the illustration on page 36.

The World's Largest Diesel Truck Fleet

The order to re-power 43 more trucks with Cummins diesel engines will make the diesel truck fleet owned by the Colonial Sand & Stone Co. of New York City the largest in the world. This company had previously converted 49 Mack trucks to diesel units and purchased 77 new Macks, 67 of which are powered with 4-cylinder Cummins diesels and 10 with 6-cylinder Mack diesels. The additional 43 diesels which were placed in Boulder Dam type Macks make a total of 169 diesel-powered trucks in a fleet of over 200.

While the advantages of diesel power for long hauls have been recognized for some time, it is only fairly recently that their suitability for short-haul work has been demonstrated. F. B. Carbone of the Colonial Sand & Stone Co. states that its diesel engines save from $3.00 to $5.00 per day per truck in fuel costs. In addition, he says that the average truck speed has increased from 25 to 32 mph, enabling each truck to make an extra run per day. As an example of the extra speed possible, Mr. Carbone pointed out that one run which used to take 3 hours and 45 minutes now takes only 2 hours and 30 minutes.

Steel Sheet Piling

A 24-page booklet containing a description and specifications of Bethlehem steel sheet piling and the necessary connections has recently been issued by the Bethlehem Steel Co., Bethlehem, Pa. This piling includes plain piling sections, Y piles, and H-bearing piles. The various uses of this piling for walls, cofferdams and trench construction are discussed and illustrated.

Copies of this Catalog No. 151 may be secured by interested contractors and engineers direct from the manufacturer or from this magazine.

UNION HAMMERS

Performance and Versatility, to match 39's piling problems

Whether driving steel sheeting, round wood piles, pipe, concrete piles, square timbers, or wood sheeting, you will find the proper base among the extensive UNION line to do the job quickly and without damage. These bases are interchangeable when for the same size hammer. All sizes of UNION pile hammers are constructed so simply that an ordinary mechanic can adjust and repair them.

Write for UNION'S complete catalog

P.O. Box 18 Elizabeth, N.J.

UNION IRON WORKS, INC.

Close-figuring Contractor

GIVES CREDIT TO LUBRICATION

THIS BUCYRUS-ERIE SHOVEL *is powered by a Caterpillar Diesel, lubricated with Texaco Ursa X Oil.*

TEXACO URSA X *lubricates this Caterpillar Diesel. The gears are lubricated with Texaco Crater Compound.*

ALL FITTINGS *on all W. J. Sheppard's equipment get Texaco Marfak. And all gasoline engines in his Mack Trucks are fueled with Texaco* Fire-Chief.

SUCCESSFUL BIDDING DEMANDS equipment that keeps going, day and night. Contractor W. J. Sheppard of Chicago, Illinois, avoids delays by using Texaco Lubricants 100%.

Read the captions for the three illustrations. Then you will realize that Texaco Lubricants can help you, too.

Trained lubrication engineers will help you select suitable Texaco Lubricants. To order, phone the nearest of 2186 warehouses, or write directly to:

The Texas Company, 135 East 42nd St., N. Y. C.

Texaco Dealers invite you to tune in The Texaco Star Theatre—a full hour of all-star entertainment —Every Wednesday Night—Columbia Network— 9:00 E.S.T., 8:00 C.S.T., 7:00 M.S.T., 6:00 P.S.T.

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STERLING QUALITY CONSTRUCTION EQUIPMENT

All vital parts are close grain wear-resisting nickel semi-steel. This is your assurance of wear protection on both sides of the impeller. Specify Sterling and be assured of dependable long-life performance.

Write Today for Literature and Prices

Sterling MACHINERY CORPORATION

Giant Belt Conveys Aggregate at Coulee

(*Continued from page 1*)

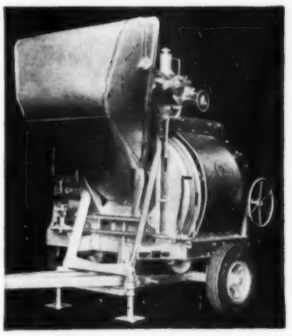
stockpile near the mixer site. Being 4,968 feet, center to center of pulleys, or almost 10,000 feet in actual length, and 48 inches wide, with a theoretical capacity of 2,700 tons per hour, the belt was so big that it had to be made in eight pieces of 10 tons each, to facilitate shipment. These were later vulcanized end to end after they were placed on the rolls, making one continuous belt.

This big run of belt gets mention first because it is the most spectacular. But it represents less than half of the conveyor story. From the first belt conveying raw material from the gravel pit to the crusher, on through the various operations of washing and screening, down the long hill to the stockpiles, and from under them up into the mixing plant, no less than 25,000 linear feet of conveyor belt are required, in widths of 36, 42, 48 and 60 inches.

Since asuming the contract for building the dam to its ultimate height, Consolidated Builders, Inc., spent the first part of 1938 in building the steel trestle (by subcontract) for concrete placing, rehabilitating equipment of all kinds, overhauling the gravel plant and greatly increasing its capacity, opening the gravel pit to a lower level and rebuilding the mixing plant. The former west side mixing plant was moved to the east end of the trestle, and the former east side plant moved up 180 feet and the two combined, on a level with the deck of the new trestle. By early fall, concrete placing operations were in full swing and it was anticipated that concrete would be poured at rates even greater than in the past. There was still about 6,000,000 cubic yards of concrete to be placed, and the new "rubber railway" system is a factor of utmost importance in washing, classifying and transporting a large section of mountainside a distance of a mile and a half to serve a mixing plant which has never before been approached in magnitude.

The aggregates can be brought down to the mixers at the theoretical rate of 2,700 tons per hour, which can be reached in practice and probably exceeded if necessary. But the raw materials to be handled far exceed the amount of the finished product, since approximately 50 per cent of the material excavated is wasted. Even before the trestle was completed, for some concrete pouring started at the east end of the dam, the C.B.I. was handling up to 4,000 tons per hour of raw material, with plenty of capacity to spare. By the time the dam is completed, the engineers estimate that the waste will exceed 10,000,000 cubic yards, mostly sand. Consequently, the belt conveyor system is not only busy feeding mixers but is engaged in piling up a mountain of wasted materials only slightly less in volume than the mammoth Grand Coulee dam itself.

See the descriptions of new equipment in this issue and write to the manufacturer or to us for further details.



The New CMC 14-S Two-Wheeler

Two New 14-S Mixers

Among the additions to the CMC line for 1939 are two new 14-S mixers which, with the light-weight 14-S end discharger introduced several years ago by the Construction Machinery Co., Waterloo, Iowa, now offer a complete choice of 14-S mixers to meet every type of job situation.

The two new mixers, a 2-wheel end discharger and a 4-wheel side discharger, are made of special manganese steel and other alloys which effect weight reductions without sacrificing long life or sturdiness, according to the manufacturer. This lighter weight increases the portability of these units, making them particularly adaptable for bridge and culvert construction.

New Sewer Pipe Book

Complete information on the use of Transite asbestos-cement pipe for sewer lines is contained in a new illustrated brochure recently issued by Johns-Manville, 22 East 40th St., New York City. In addition to tracing the history of asbestos-cement pipe, the booklet describes how this type of pipe is manufactured and discusses its advantages for use in gravity sewer lines and force mains.

The sleeve-type joints used in gravity mains and the Simplex couplings used in force mains are described, with illustrations to show the methods of assembly. Another section of the booklet gives specifications for the pipe, a table of crushing strengths, and a list of the dimensions and weights in which the pipe is manufactured.

Copies of this booklet, Form TR-21A, may be secured without obligation direct from the manufacturer.

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WELLPOINT SYSTEMS
DRY WET JOBS AT A PROFIT!
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SHOVEL - DRAGLINE - CRANE
Yardage Counts
"My job is to keep the crew producing and that's why I'm a Speed-o-Matic booster. More yardage — trucks loaded faster — operators happy and going full speed throughout their shifts. Believe me, I'm through with old-fashioned mechanical hand-lever machines!"
1939 NEW YORK WORLD'S FAIR EXHIBITOR
Buys one Speed-o-Matic . . . orders two more!
Actual results on tough jobs proved to the owner of this shovel (name on request), that a Speed-o-Matic will do everything claimed for it and more. That's why their purchase of one Speed-o-Matic soon led to repeat orders for two more and the fact that this company had 20 shovels, draglines and clamshell cranes of various makes in operation placed them in a position to accurately judge Speed-o-Matic performance.
It will pay you to get complete information on Speed-o-Matic Shovel-Dragline-Crane. Write today!
OBSOLETES THIS
Operator fatigue banished — machine action speeded up — wearing parts greatly reduced — that's Speed-o-Matic!
EASY AS DRIVING A CAR
LINK-BELT COMPANY
300 West Pershing Road, Chicago
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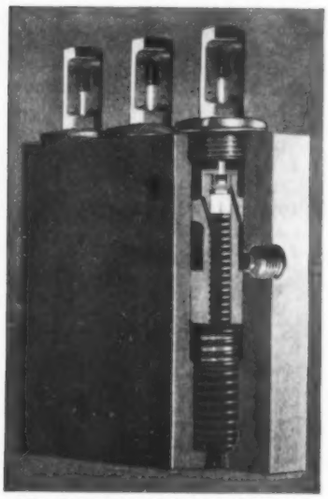
SAND'S-STEVENS
Line & Surface LEVEL
Endorsed and Adopted by Road Builders and Contractors
Level is easily and quickly attached to line. Special feature construction prevents accidental detachment from line. Construction is sturdy, and accuracy guaranteed.
SAND'S LEVEL & TOOL CO.
8831 Gratiot Ave. Detroit, Mich.



The Blaw-Knox Model H Lubricator

Blaw-Knox Announces New Line of Lubricators

A new line of grease lubricating equipment for cranes and auxiliary equipment has recently been announced by the Blaw-Knox Co., Gordon Lubricators Division, Pittsburgh, Pa. It is known as the Model H lubricating system and contains a manually-operated pumping unit designed for use with the new Model H measuring valve.

The pump holds 8 pounds of grease and can be filled by hand or by means of a portable grease pump through a fitting provided for the purpose. Double acting pistons reduce the time cycle of operation, and a detachable handle is a safety precaution against tampering or excessive operation. Other equipment includes a control valve, a grease strainer and a pressure gage.

The Model H valve operates on a simple displacement principle. The springs used are compared in their action and design to the valve springs used in automobile engines. The line pressure from the pumping unit is utilized in forcing a measured shot of grease into the bearing, and when the pressure is relieved at the pump the valves recharge in readiness for the next greasing cycle. Each valve operates as an independent unit although lubricating blocks may be made up in multiple feed groups of as many as four valves. Each valve has an indicator which gives evidence of the charge of grease being delivered to the discharge line.

This auxiliary equipment lubricating system adheres to the Gordon Lubricators' principles of single-line operation. When centrally motivated, each valve is adjustable as to the quantity of grease, being capable of feeding from 0 to 0.4 ounce per shot. It is claimed that this principle provides economy of installation and operation.

Spreader-Finishers for All Types of Road Work

Adnun Finish Spreaders are designed to handle and spread all types of road stone, slag, gravel and cinders as well as for spreading and finishing the lighter forms of bituminous mixtures such as light tar, cutback and emulsion mixes. This unit, which is pulled forward by the truck as the material is dumped, is simple in design and operation.

A 4-page folder describing and illustrating this piece of road equipment for construction and maintenance may be secured by interested contractors and state and county engineers direct from the Foote Co., Nunda, N. Y.

New Bulletin Describes Expansion Joint Filler

A new bulletin on the use of Goodrich preformed expansion joint filler in concrete construction has just been released by the B. F. Goodrich Co., Akron, Ohio. In addition to describing this rubber joint, this bulletin contains actual size cross-sectional drawings of the seven different types of fillers offered, illustrates the various methods of installation, and lists typical specifications.

Copies of this bulletin A.I.A. File No. 4-E-11 may be secured by interested contractors and engineers direct from the manufacturer.

Nelson "JUMBO" Engine Driven Centrifugal Pump Units

Mounted on welded steel base and easily portable

These units are particularly adapted for road building and general contracting, for irrigation, and for pumping clear or muddy water from sewers or trenches.

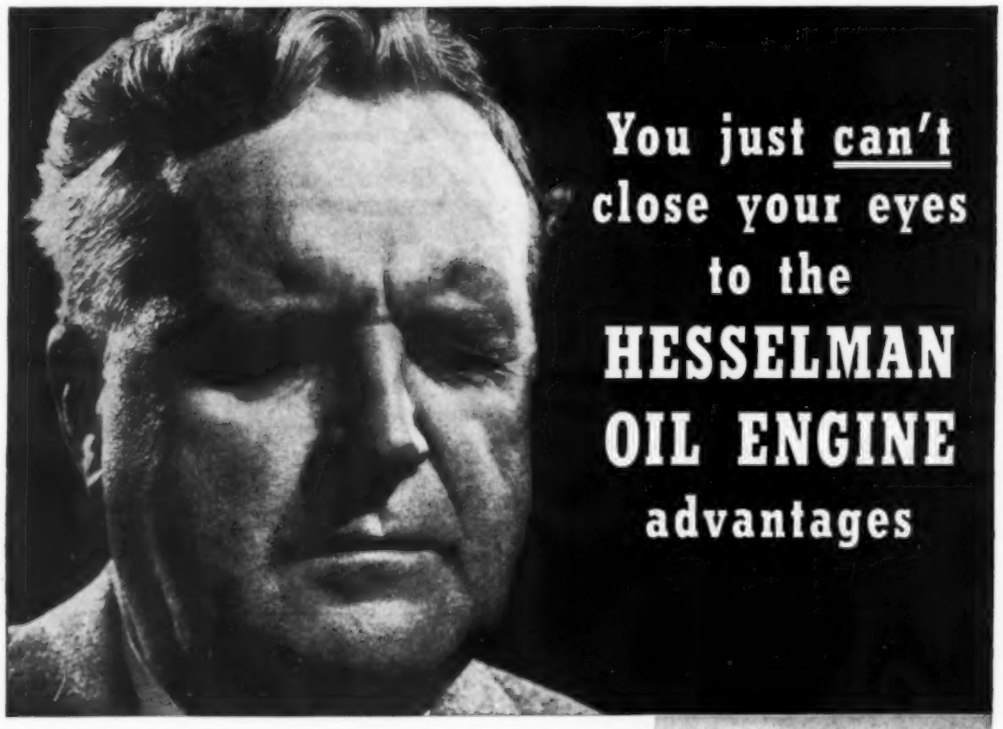
Pumps—side suction, of sturdy construction; open type impeller.

Engine—4-cycle; 1, 2 or 3 hp.; speed 1500-2400 r.p.m., governor-controlled.

Write for circular

Also manufacturers of AIR AND WATER-COOLED ENGINES, LIGHT AND POWER PLANTS, and CONCRETE MIXERS.

Nelson Bros. Co., Saginaw, Mich.



With none of the Diesel's high pressure disadvantages, the Hesselman Oil Engine has *all* of the *proved performance advantages* of low pressure gasoline engines, *and more*—

BURNS LOW COST, EASY-TO-GET FUEL OILS—A Hesselman not only operates efficiently on any fuel that a Diesel can, but burns all the popular low cost, domestic burner oils—fuels that you can get anywhere—and burns them with the greatest over-all economy.

STARTS EASIER THAN YOUR CARBURETOR ENGINE—Because the Hesselman combustion chamber form is inherently easy starting—has a built-in gasoline priming system—an extra hot, electric spark ignition—cranks easily.

BURNS LESS FUEL OIL, IN GALLONS than a gasoline engine of the same size and output.

NO HIGH PRESSURE PROBLEMS—Working pressures are the same as those of modern gasoline engines—125-135 lb. compression, 425-450 lb. peak.

NO HIGH TEMPERATURE PROBLEMS—Temperature range, *in the cylinder*, where heat does the most damage, is the same as with the modern gasoline engine . . . no burned pistons, over-heated rings, cracked heads, etc.

LONGER LIFE, WITH LOW UP-KEEP—With a Hesselman Oil Engine, and pressures no higher than in a gasoline engine, there's no excessive stress and strain on the engine itself.

NO CHANGE IN YOUR SET-UP—To equip your customers' jobs with Hesselman Oil Engines requires no change in clutches, drive shafts, universal joints, axles or transmissions.

You'll want details—write for Bulletin 1000

WAUKESHA HESSELMAN OIL ENGINES

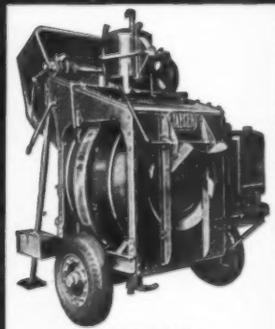
FOR THE GREATEST OVER-ALL ECONOMY

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN

NEW YORK • TULSA • LOS ANGELES

THIS IS No. 11 OF A SERIES ON THE WAUKESHA-HESSELMAN OIL ENGINE

BUYING A MIXER?



DEMAND:

- Faster Charging and Discharge Speeds,
- Machined Steel Tracks,
- 2 Wheel Mounting with Timkens and Pneumatics,
- End Discharge Advantages,
- Man-Ten Alloy Steel,

Send for New Catalog, Prices 3½S to 56S Sizes.

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701 Dublin Ave., Columbus, Ohio

JAEGER

San Francisco Calls All Construction Men

Between March 5 and March 10, 1939, fully twenty-five thousand builders and contractors engaged in both light and heavy construction will attend the Construction Congress in San Francisco. Included in the organizations which will meet in San Francisco at that time during the 1939 Golden Gate International Exposition are: the American Road Builders' Association, the Associated General Contractors of America, Associated Equipment Distributors, the Western Association of State Highway Officials and the California County Supervisors Association.

"This congress will chart a course toward tremendous public and private improvements. These builders will offer a permanent solution to unemployment," remarked C. H. Purcell, State Highway Engineer of California, during a recent interview.

New Thew Appointments

The Thew Shovel Co., Lorain, Ohio, has announced the appointments of R. H. Zeilman as Chief Engineer and A. J. Gillespie as Assistant Chief Engineer in charge of the newly consolidated and enlarged engineering department at the Lorain plant. The Cleveland engineering department has been moved to Lorain and merged with the engineering department there.

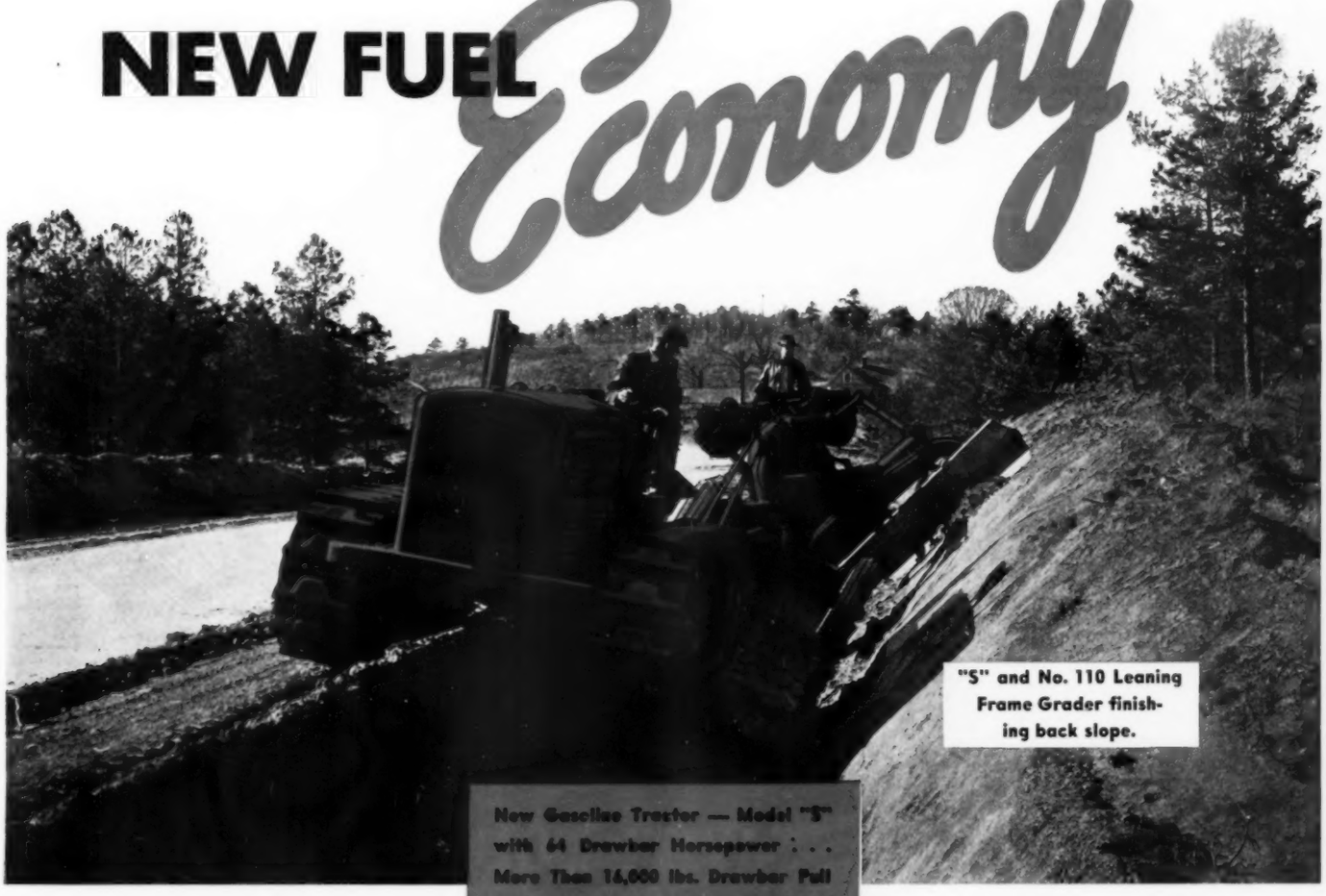
Bulletin on Cleaning Unit For Clogged Culvert Pipe

The Morco culvert cleaner, a quick-acting tool which cleans out small size culvert pipe and which also holds the material so that it can not drop off the scoop or fall back into the pipe, is described in a new folder issued by the Monarch Road Machinery Co., 329 Front Ave., N. W., Grand Rapids, Mich. This Mechanical Mole is made of 16-gage alloy steel, with a round bottom to fit the contour of the culvert and a reinforced back.

Copies of this folder containing further information on this tool may be secured by interested state and county highway engineers direct from the manufacturer or from this magazine.

Each motor vehicle owner pays for the upkeep of one-tenth mile of highway in taxes, says Thomas H. MacDonald, Chief, U. S. Bureau of Public Roads.

NEW FUEL *Economy*



"S" and No. 110 Leaning Frame Grader finishing back slope.

New Gasoline Tractor — Model "S" with 64 Drawbar Horsepower . . . More Than 16,000 lbs. Drawbar Pull . . . Five Forward Speeds—1.52 to 6.37 M.P.H. . . . New Gasoline Fuel Economy . . . Shifts on the Go, Like a Truck.

Here's a new gasoline tractor in the 60-70 H.P. class—the Model "S" — with all the cost-cutting FASTER POWER features that makes the Model "L" so profitable for contractor use . . .

Quick pick-up — High working speeds
Great lugging ability — Ease of handling
Fast maneuvering — Low maintenance cost

. . . *plus* a constant mesh transmission that enables you to "shift on the go" . . . *plus* a new fuel economy never before attained in a gasoline track-type tractor. This tractor has power aplenty to handle 7 and 8-yard scrapers, pull 12-foot blade graders, 10-yard wagons and do heavy work with bulldozers, trailbuilders and winches.

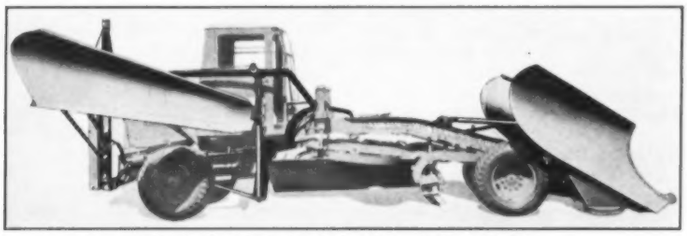
See for yourself how the "S" can cut cost corners on your jobs. Ask your Allis-Chalmers dealer to demonstrate.

ALLIS-CHALMERS POWER

TRACTOR DIVISION—MILWAUKEE, U. S. A.

TRACTORS • ENGINES • ROAD MACHINERY

IT DOESN'T COST .. *it Pays!*



The Austin-Western Giant 99 Snow Plow and Wing

Large Snow Plows For Power Graders

A large hydraulically-operated V-plow with an unusually strong all-welded framework has been announced by the Austin-Western Road Machinery Co., Aurora, Ill., for mounting on the Austin-Western 99 motor grader to use the four-wheel drive and steer advantages of that grader to remove deep snow at higher speed. This plow "cuts under" as it pierces the drifts, elevating the snow over its long curved moldboards, with a minimum of resistance, and finally throwing it outward to clear the plow.

The giant 99 V-plow opens a path 9 feet 2 inches wide and the plow itself is 12 feet 7 inches wide at the tips of the blade. It stands 4 feet 4 inches high at the top of the nose and 7 feet 2 inches high at the blade tips. The two inside runners are of hard cast iron and the two outside runners of cast steel.

For opening roads with drifts and where the plowed snow has been piled high, a rear-mounted snow wing is available to push the piled snow farther to the sides. These wings are operated hydraulically and controlled from within the cab. It is possible to raise or lower the end of the wing to any desired position. The wing is mounted independently of the moldboard and does not interfere with its operation or that of the blade circle. The grader moldboard can be raised or lowered, shifted either way or reversed in the customary manner. By varying the length of the two telescopic shafts that rigidly support the wide end of the wing, the angle of cut or tilt can be changed to suit any snow condition. The rear wing supports are secured to the bumper of the motor grader with U-bolts, while the forward bracing is bolted to the grader frame.

New Line of Trucks Announced by Dodge

Streamlined from bumper to bumper and incorporating advanced engineering features made possible by a giant new truck plant, the 1939 models recently announced by the Dodge Truck Division, Chrysler Corp., Detroit, Mich., include a diesel truck in the 3-ton line, in wheelbase lengths ranging from 152 to 205 inches, with a new Dodge diesel engine.

This new engine is a full compression ignition diesel of 331-cubic inch displacement, with torque and power ratings of 226 pound-feet at 1,000 rpm and 95 hp at 2,600 rpm. It has 6 cylinders and a 3¾ x 5-inch bore and stroke. Its general dimensions, mountings and crankcase structure are identical with those of the Dodge 3-ton truck gasoline engine, permitting economies in the manufacture and chassis installation of the engine. The electrical system is full 24-volt throughout to provide adequate cranking ability. When starting, application of the full 24-volt potential is automatically delayed until after engagement of the starting motor is completed.

This year Dodge offers new Dual-Purpose models in 1½-ton heavy-duty and 2-ton models for use where unusual flexibility is required. A two-speed axle installed in the factory and available in two combinations of ratios gives each model at least eight speeds forward and two in reverse.

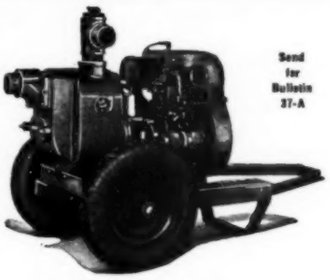
In addition to the new streamline styling, new features common to all 1939 Dodge trucks are larger cabs, running board splash shields integral with the cabs, increased seat heights, windshields integral with the cabs, windshields located for improved vision, frame side-rails extended to support a new channel-type bumper without the use of intermediate brackets, a new type of stronger steel used in the trucks, and substantially lower prices.

The features of the ½, ¾, 1, 1½, 2 and 3-ton models are described in literature which may be secured direct from Dodge Truck Division.

New Catalog Describes Heavy-Duty Trailers

La Crosse heavy-duty trailers for transporting machinery and materials are described and illustrated in a complete catalog recently issued by the La Crosse Trailer & Equipment Co., La Crosse, Wis., manufacturer of the world's largest trailer which was used at Boulder Dam. The La Crosse line includes trailers on regular, pneumatic or solid tires, in twelve different types, and in capacities up to 50 tons.

Copies of this catalog may be secured by interested contractors and state and highway engineers with problems of transporting equipment or heavy loads of material direct from the manufacturer by mentioning this item or from this magazine.

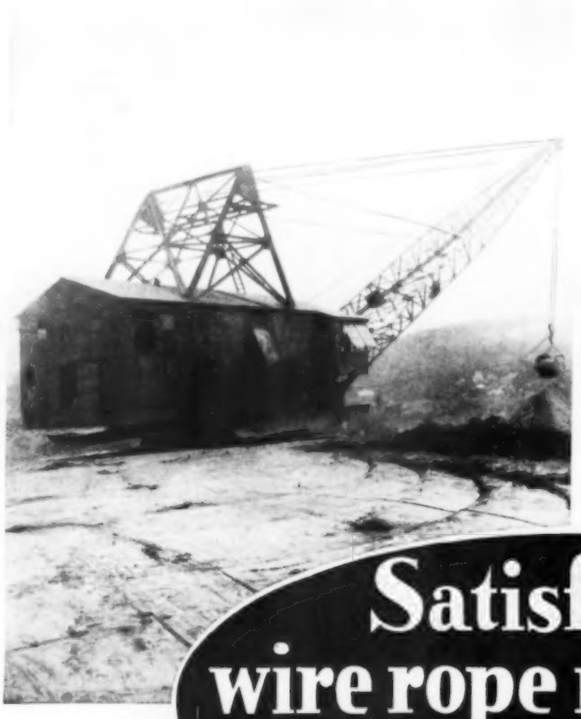


3" High-Capacity Pump

Marlow self-priming design on double tube pneumatics. 20,000 gallons per hour. Self-priming up to 25' *guaranteed.* Especially satisfactory in pumping very dirty water.

Manufactured by

MARLOW PUMPS
Ridgewood New Jersey



Satisfy your wire rope needs with *Precisionbilt* Ropes

Other J & L Steel Products:
Jaltruss Bridge Floor Reinforcement Sections—Bar mill products, including Bars for Concrete Reinforcement—Bar size shapes—Hot Rolled Plates and Structural Shapes—Junior Beams—Lightweight Channels—Standard Pipe in seamless and welded—Wire Nails and Spikes—Tie Wire—Galvanized Steel Roofing and Siding.

The true value of a Wire Rope is naturally based upon the service it renders, per dollar—the stamina—length of life and its general performance—and to get the best results you must get perfection in manufacture—as near as possible.

And to accomplish perfection in Wire Rope manufacture you must have the very latest perfection in machinery plus the skill that comes from long experience.

This is what we offer in Gilmore Precisionbilt Ropes. Every operation from mines to the finished product is supervised by men of long experience in Wire Rope manufacture plus the metallurgical supervision of men who know how to produce the finest steel. The J & L Gilmore plant is a marvel of perfection—every machine the latest engineering achievement.

Will you let us supply you with your next replacement so that you can see the difference?

New catalogs will soon be ready—send for yours and let us quote our price.

GILMORE WIRE ROPE DIVISION
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PITTSBURGH • PENNSYLVANIA

Those Blasted Stumps Near Lived-In Houses

L. F. Livingston of du Pont Develops "Stump Cribbing" as New Protective Method, Permitting Close Work

✦ BLASTING to remove stumps near buildings has always been a problem for even the most experienced blasters. While the methods employed have varied, a satisfactory means of doing the work without the probability of some degree of damage being done was not evolved until "stump cribbing" was developed. The advantage of cribbing is at once evident because stumps have been taken out as near as 20 feet to structures with ordinary foundations by competent blasters. Where a building is supported by substantial piers, blasting may sometimes be done to within 6 feet of the structure.

For stump cribbing, loading is done in the usual approved ways; that is, with two or more holes under a stump with spreading roots, or a single charge inserted in a tap-root, or for a tap-root stump. It is very important that the charges of dynamite be placed approximately 25 per cent deeper than ordinarily. This requires slightly heavier charges, yet overloading must be guarded against. The reason for deeper loading is to provide a greater "cushion" of earth above the shot. Conditions may require that, instead of attempting to blow out a stump with a single shot, the work be done with two or more blasts.

How a Stump Is Cribbed

After loading, the stump is completely and thickly covered with sturdy brush. The thickness of the brush mat is never less than 12 inches at all points, and is usually thicker. As an additional precaution, meshed wire fence material should be spread on the top and sides of the brush. This is laced together with strong wire. Then a pyramid of logs is constructed over the pile of brush. Old railroad ties, if sound, are excellent for the purpose. Next, a strong chain is looped around the logs and the ends of the chain are securely joined. Where a chain is not available, a heavy wire cable is substituted. Care is taken not to have the chain or cable too tight. Seldom, if ever, is a chain or cable broken by a blast.

For a better understanding of the need for cribbing stumps in the vicinity of buildings, it is well to remind blasters that an explosion of dynamite has two actions, a breaking or rending followed by a heaving action. Both of these actions are exerted equally in all directions, but follow the line of least resistance.

When cribbing is done properly, the brush serves as a cushion to absorb the shock of the breaking action of the explosion not cushioned by the soil. Therefore, only the slower heaving action, the part not dissipated in lifting the stump and the soil, is exerted on the log pyramid. The weight of the logs keeps the heaving action of the blast from throwing either the pieces of brush or fragments of stump and thereby prevents damage from these sources.

Avoiding Ground Shock Damage

Although cribbing a stump can obviate damage from flying fragments, cribbing does not control ground shock caused by the flow of an explosion wave. The resultant vibration is capable of great damage when heavy. It should be kept in mind that wet ground transmits shock very much more readily than does dry earth. This, of course, suggests that in some instances it is better to do shooting when the soil is dry, despite the fact that blasting stumps in wet soil offers well-known advantages.

A stratum of rock is a potent medium for the transmission of the shock of an explosion. Therefore, it is exceedingly important that soundings be made to determine whether the rock under a stump which is to be blasted extends to or under the foundation of a nearby structure. When rock is present extreme precaution must be observed.

Because shooting near a building always involves a degree of hazard, it is strongly suggested that the blasting be done only by those whose skill and experience make them competent. While blasting is in progress the occupants of a building should leave it until after the operations are completed. Animals also should be removed from structures near where blasting is being carried on.

Finally, all the customary safety rules for using explosives must be adhered to strictly in stump cribbing as in all other blasting.

New Diesel Power Catalog

"Diesel Power at a Touch of the Button" is the title of a new 16-page two-color illustrated catalog describing Cletrac electric-starting diesels made by the Cleveland Tractor Co., Cleveland, Ohio. Questions such as just how a diesel differs from a gasoline engine, what is this talk about turbulence, what is meant by fuel injection and why is a diesel more economical are answered, in addition to which Cletracs are described and illustrated on a variety of jobs.

Copies of this new catalog may be secured by interested readers of CONTRACTORS AND ENGINEERS MONTHLY direct from the manufacturer or from this magazine.

COMPLETE
WELL POINT SYSTEMS
WILL DRY UP ANY EXCAVATION
Faster—More Economically
Write for Job Estimate and Literature
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MACHINERY & EQUIPMENT CO., Inc.
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EXTRA OUTPUT

The most modern type of jaw crusher . . . for coarse or intermediate crushing . . . the Telsmith-Wheeling is equipped throughout with *cylindrical roller bearings*. This crusher delivers more crushing strokes per minute . . . almost double capacity . . . and greater reduction in one process than with any other type of breaker. All internal frictional wear is taken on the bearing races . . . no wear on shaft. Up-keep is reduced . . . service life prolonged. 7 sizes. *Write* for Bulletin W-34.

EXTRA PROFITS

For large output of fine aggregate at reduction ratios not over 3:1, use the Telsmith Double Roll Crusher. It produces less oversize than any other type of secondary crusher. Its compact design saves head room and weight. Anti-friction bearings (running in oil) and spring release insure high speed, continuous, trouble-free operation. First cost is low, too. *Write* for Bulletin L-34.

LOWER UP-KEEP

Sand, gravel, crushed rock, ore, coal—Telsmith Pulsator *screens 'em all*, wet or dry, and does it *right*. Its circular movement produces a maximum screening action that's *uniform* on every inch of the wire, regardless of load. Telsmith builds in greater value, longer life and lower up-keep with the toughest alloy steels, anti-friction bearings, and special seal protection for working parts. 11 sizes . . . 1, 2, 3 and 4 decks. *Write* for Bulletin V-34.

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TELSMITH

Concrete VIBRATORS
AND GRINDERS
Write for Circular on types, sizes and prices
White Mfg. Co.
ELKHART INDIANA

Southern Contractor Makes Road Job Click

(*Continued from page 1*)

content. The contractor used a heavy-duty digging bucket throughout as the limestone required the heavier bucket to dig into the material in the cars for unloading and it was useless to change the bucket from time to time. Two men were used in the cars for cleaning up and spotting the bucket.

On this job there were two batching bins, the first a 70-ton Blaw-Knox steel bin with a pair of Johnson cylindrical batchers for sand and gravel, and the second a smaller Blaw-Knox bin with a single Johnson batcher for the Type E 2½ to 1-inch limestone. The bins were located about 100 feet apart but were served by the same crane. The batch trucks backed under the stone bin and received that part of the batch and then moved on and backed under the second bin for the sand and gravel. They then drove forward toward the job about 200 feet to the siding where three men loaded the six bags of cement onto each of the two batches in each truck. The batch-hauling fleet in the middle of the job consisted of 12 White trucks, 4 Macks and 3 Fords. During the longest haul the contractor used 35 trucks.

After the trucks had been turned on the Blaw-Knox turntable on the grade by two men, a crew of four men dumped the bags of cement onto the aggregates. One man clipped the bags, two men emptied and one man packed up the bags.

At the batching plant the contractor rigged a long string of electric lights on 25-foot poles and furnished his own electricity with a 2,000-watt Kohler electric plant. This was used for night work in unloading the sand to the stock-piles as the single crane could not do that work in the daytime and also serve the bins. The batches consisted of 1,354 pounds of sand, 1,104 pounds of gravel and 1,656 pounds of limestone for the six bags of cement.

Joints and Center Steel

One of the operations that every contractor feels slows down the job as far as speed in pouring the slab is concerned is the placing of the very necessary center steel and expansion and contraction joints. On this job two men set the Truscon center steel just after the paver had passed. The center steel was used in 10-foot lengths with ½-inch round deformed dowels 4 feet long spaced 5 feet on centers.

Expansion joints were placed every 90 feet with intermediate contraction joints every 30 feet. The expansion joints consisted of ¾-inch impregnated Celotex cut to the exact 9-6-9-inch cross section of the slab. The steel at the expansion and contraction joints was identical, consisting of 16 dowels 24 inches long and ¾-inch round coated with asphalt and held in a true horizontal position with stamped sheet metal pins. This contractor used a novel method to insure the proper position of the dowels during pouring which is the time when they are most liable to get knocked askew. A long box or gage open at the bottom and built of 2 x 4's with a plank over the top and extending the full width of the 20-foot slab was placed just back of the steel for the joint when the concrete was poured. The concrete hit the steel and with the backing was kept in its proper position. As soon as the concrete had filled the steel on both sides of the expansion joint and the entire contraction joint the gage was removed and placed ahead on the shoulder in the approximate location of the next joint.

Making Speed on the Slab

In order to make 1,600 feet in a 12-hour day with a 9-6-9-inch cross section, every part of the job contributing to the placing of the concrete and the preparation of the grade must run smoothly. During the last week of April the contractor averaged better than 1,650 feet during the period when it was possible to run, there being a temporary shut-down because of the failure of a part of the aggregates to meet specifications. The first requirement that the contractor set for himself was that there were always to be three batch trucks waiting on the grade, with the cement emptied on the batches, and turned

(*Continued on next page*)

PILE HAMMERS and EXTRACTORS
HOISTS—DERRICKS WHIRLERS
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Special Equipment
Movable Bridge Machinery
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Write for descriptive catalogs.
McKIERNAN-TERRY CORP.
19 Park Row, New York
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LAYING BLACK TOP?

JAEGER PAVER has 10 ADVANTAGES:
- 18 Ft. Movable Forms Give Smoothness of Concrete,
- 50% More Traction,
- No Load on New Material,
- Adjustable 9 to 14 Ft. Widths,
- Blends Perfect Joints,
- Capacity to 1000 Tons a Day,
- Lays Hot or Cold Bituminous, Stone or Macadam,
- Pug Mill Spreader,
- Less Hand Finishing,
- Automotive Construction,

Write for New Catalog, Prices.
THE JAEGER MACHINE CO.
701 Dublin Ave., Columbus, Ohio
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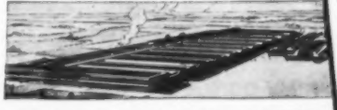
COME ON IN AND *SEE* THESE NEW DODGE TRUCKS

A BETTER TRUCK FOR CONTRACTORS...Priced with the Lowest

SEE FOR YOURSELF HOW NEW DODGE STYLING...NEW LARGER CABS...NEW RUST-PROOFING...NEW "TRUCK-BUILT" CONSTRUCTION HAVE RAISED TRUCK VALUES TO A NEW PEAK IN THE LOWEST-PRICE FIELD!

New 1939 Dodge 1½-Ton Heavy-Duty Chassis and Cab, 125¾" W.B.—Here is real quality at a real low price. Compare! Delivered ready to run at Detroit, including front bumper, radiator ornament and all standard equipment and Federal taxes. Dual wheels, transportation, State and local taxes (if any) extra—only.....$725



WHAT "TRUCK-BUILT" MEANS TO BUYERS
Dodge trucks are built in this giant new plant, specially engineered to build trucks. New manufacturing methods, huge new processing equipment now make possible extra quality advantages never before available in low-priced trucks. "Truck-Built" construction means more for your money in the lowest-priced field.

COMPARE PRICES!
You'll find Dodge, with all its extra quality, now priced with the lowest!
$465 ½-Ton, 116" W.B. Chassis—delivered at Detroit, complete with spare tire and all standard equipment. Price includes Federal taxes. Transportation, State and local taxes (if any) extra.
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EASY BUDGET TERMS!

SEE the new Dodge Trucks! See how much extra value Dodge gives you, at low 1939 prices, in prestige-building beauty and extra economy features. See how Dodge trucks lead the whole low-price field in advancements like rust-proofing of complete cabs and bodies, super-tough Amola steel axle shafts, springs and other vital parts, and many other things that mean important savings for you. Then take a test and let the truck speak for itself. See your Dodge dealer today!

See For Yourself TAKE A TEST *See Your Dodge Dealer*

C. & E. M. Photo

Barber Bros. Developed This Device to Give the Strike-Off a Lift Over Expansion Joints

"Speed" is Word On Louisiana Job

(*Continued from preceding page*)

ready to back to the paver.

The Foote 27-E paver was equipped with a Carr Push Planer in front and a Koehring planer in back, set to cut the last ½ inch from the grade and leave an even, firm, smooth grade for the concrete. The Push Planer carried the dowels and metal caps for the expansion joints. Caps were placed on the ends of the dowels for the expansion joints and not on the contraction joints. As the Push Planer only cuts the grade and windrows the material it was not necessary to have men there to shovel out the excess dirt. They worked, one on a side, in front of the Koehring planer and also took turns in sprinkling the dry grade. Immediately behind the planers and before the center steel was placed were two checkboards pulled by four men. The first was a heavy template made up of a pair of 2 x 12's and the second a lighter board used entirely for final checking.

After the steel was placed the concrete hit the grade with unfailing regularity. The batches had a 60-second mix and the paver was set for a 5-second lift and dumping of the skip and another 5 seconds to drop to the ground. Five puddlers worked ahead of the Blaw-Knox gas-electric double-screed finishing machine and spaded against the sides of the forms to prevent honeycomb. A power strike-off operated by the winch on the paver cut the concrete 2 inches below the top of the forms for the placing of the spot-welded wire fabric mats which were handed in by two men from the piles on the sides. These two men also looked after the hose and carried back dowels and steel for the center joints and transverse joints.

The strike-off was equipped with an eccentric on either side with levers so that as the strike-off came to an expansion joint it could be raised easily by the men at the side and thus ride over the fiber joint instead of hitting it. Numerous methods have been noted for doing this, such as metal or wood humps held on the forms for the strike-off to ride over, but this device which this contractor developed himself is the easiest we have noted.

Curing and Finishing

Behind the gas-electric transverse finisher the contractor used four hand finishers. The first two used a 12-foot longitudinal float and then a pair of 10-foot wood drag straight-edges followed by a pair of aluminum checking straight-edges. They also operated long-handled 8 x 2-inch x 4-foot floats where needed over the joints and where low spots were brought up with extra concrete brought back by the outside steel men. After this, they topped off their work with a 10-inch wide bow belt, leaving a herringbone finish to the surface.

The second pair of finishers drove the ¼-inch thick steel plates into the fresh concrete to leave the plane of weakness for the contraction joints and edged that as well as the expansion joints and the sides.

A 4-wheel bridge was pushed as close as possible behind the finishers, carrying the wet burlap which was placed by two men who also kept it wet while they were on the job. A night man kept it wet for the full 24 hours after laying. The two regular sprinklers and three other men picked up the burlap the following day and swept on the solution of silicate of soda made up in old oil drums to give a reading of 36 to 37 on the hydrometer furnished by the State Highway Department.

The fine grade foreman had a crew that pulled forms in the morning and carried them ahead and spotted them for

(*Concluded on page 31*)

RENT A NEW "Simplified" ARC WELDER

The HOBART Gas Engine Drive Portable.

"NEW PROFITS in Arc Welding" Book sent free.

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IS DISTINCTIVE

The most important traffic director is the traffic line—the life-line of the highway. When the sun goes down your responsibility goes up. The keeping of traffic in its proper lane is the subject of nearly all discussions to-day. The lines must be clearly marked, visible at all times, in rain and in fog.

PRISMO LIFE-LINE TRAFFIC STRIPE

is distinctive. It provides a continuous, brilliantly illuminated stripe that is visible for a long distance, clearly marking curves and outlasting the average paint by many months.

It is economical, easy to apply and needs no care after application.

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PRISMO Bonded Fiberglas Matt is a specially treated glass fiber matt, which is ideal for use on metal, wood and concrete. This application covers bridge piers, guard rails, barricades, curb and other obstructions. The outstanding advantages of the matt are that it resists moisture, frost, heat, rain and snow, due to the use of glass fibers in the base material. It prevents vandalism.

Guard rail posts can be made exceptionally luminous with this type of marker. The matt is applied directly to the post or pier.

This type of processed PRISMO bonded fiberglas matt will undoubtedly enjoy the widest use. In addition to the marking of obstructions, any signs, picture or word message can be stenciled or silk screened in black or dark color on fiberglas matt.

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Underpass with white PRISMO FIBERGLAS. Also guard rail posts treated with same material.

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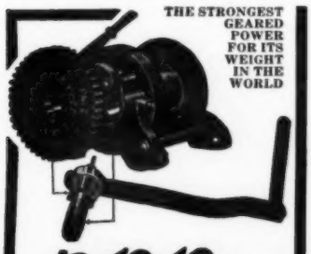

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5-Ton 4, & 24 to 1	110 lb.	$ 75
15-Ton 4, 19 & 109 to 1	630 lb.	$350

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(*Photos on pages 1 and 36*)

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Radial bins were created on the slope of a hill for the aggregates so that the trucks could dump at the top of the hill and the materials reached the single feeder man by gravity. The single exception was the coarse gravel which was fed intermittently toward the feeder man by an Allis-Chalmers 35 tractor and bulldozer. The cold elevator to the Cummer 28-foot by 54-inch drier was served by the one man mentioned. The oil-fired drier carried a Buffalo Forge Co. blower unit in each end of the drier for pulling the moisture laden air from the drier. A vertical boiler supplied steam for heating the asphalt and atomizing the fuel oil for the drier burners. The drier was rotated by a General Electric 30-hp motor. Three sets of tanks served as storage units for the liquid materials used. A 15,000-gallon asphalt tank was filled as required by a Kinney asphalt pump from the car on the siding and the asphalt brought to the required temperature by steam coils. A 5,000-gallon fuel oil tank and a 400 and a 500-gallon tank stored the liquefier for the mix. These were referred to on the job as naphtha tanks because of the inflammable character of the liquefier.

The plant was operated on the plat-

(*Concluded on page 25*)

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WINDBREAKS
CONTRACTORS SUPPLY DEALERS in every state sell the Fulton line. Specify SHURK-DRY and FULTEX Tents, Tarpaulins, and Windbreaks —anything made of canvas. Also Fulco Road Mats and Burlap. Fulton products are good and their prices are right.
If your dealer can't supply you write our nearest plant for catalog, samples and price list.
Fulton Bag & Cotton Mills
Manufacturers Since 1870
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MINNEAPOLIS NEW YORK NEW ORLEANS KANSAS CITY, MO.

NEW 1939
CHEVROLET TRUCKS
MASSIVE NEW SUPREM-LINE TRUCK STYLING . . . COUPE-TYPE CABS . . . VASTLY IMPROVED VISIBILITY
giving a much handsomer, sturdier appearance—more seating room—and much greater driver comfort, as well as greater driving safety.
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with even greater economy-leadership and with the maximum pulling power for which Chevrolet trucks have always been famous.
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extra strong—extra rugged—extra dependable . . . available on Heavy-Duty models only.
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Higher Quality—Lower Prices
45 different models
in eight wheelbase lengths
Your business is different, of course. It is for just that reason that you will be especially interested in what Chevrolet has done to provide motor trucks exactly fitted to your particular needs. There is hardly any business for which there are not appropriate trucks to be found among the Chevrolet models for 1939—the most complete and most capable line of trucks Chevrolet has ever offered.
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With Plain or Roller Bearings

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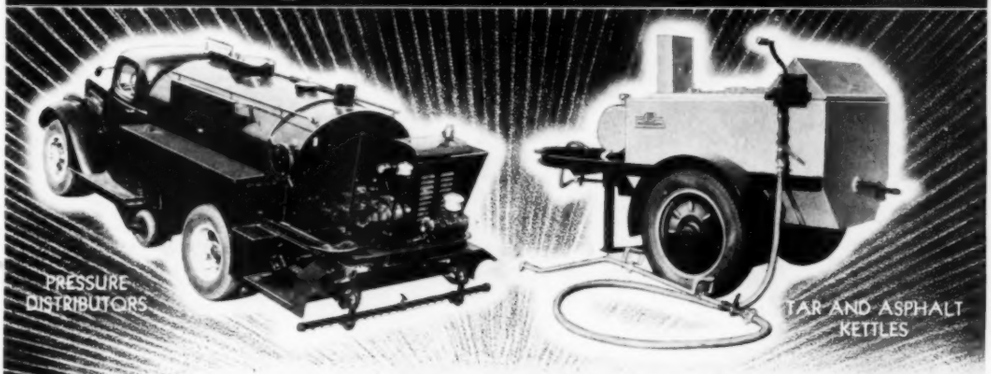

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Gives you daylight conditions on night jobs.
Spreads a full, even beam of 8000 candlepower right where you need it.
Lights up the job for twelve hours on one 7-pound charge of National 14-ND Carbide and 7 gallons of water. Is easily handled by one man; has nothing to get out of order; no harm done if it tips over—just stand it up again, and it goes right on working.
Weight 35 lbs. empty; 98 lbs. when full.

Write for catalogs on V-G Light, V-G Handy Light and Lantern

NATIONAL CARBIDE CORPORATION
LINCOLN BLDG. (Opp. Grand Central) NEW YORK

C. & E. M. Photo

The Paver on the North Bank Is Pouring Abutment Footings While the Carpenters Put the Finishing Touches on the Forms for the South River Pier at Bennington

Heavy Rains Flood Vermont Bridge Job

(Continued from page 2)

the river bed and as one of the engineers expressed it, "is the first washed gravel fill I have ever seen."

Abutments and Piers

The sequence of work on the structure was the pouring of the south abutment footing, then the columns for the abutment. This was followed by the pouring of the footing on the south river pier and then the beam on the south abutment columns. Next came the footing on the north abutment and then the south river pier. Then there was the completion of the north abutment, and the footing and pier for the north river pier. All this meant that the Ransome 27-E paver that was used to mix all the concrete was kept might busy running from one side of the river to the other right through the water when there was any. One of the moves occurred when the water was at its highest but that did not seem to make any difference.

The excavation for the footings was done with the shovel and no sheeting was required as the water was low during the excavation and the material was well packed. A small amount of ledge was encountered in excavating the footing for the south river pier.

Forms for Piers

The footings were poured without forms other than rough boards placed to confine the concrete reasonably to the dimensions of the plans. For the river piers and for the pairs of columns of the open abutments good forms were used, resulting in good appearing concrete faces even before the required rubbing was started. The forms were made up in 4 x 8-foot panels and used over for the two piers. The face material was ⅝-inch plywood made with five plies. The 2 x 6-inch studs were placed on 1-foot centers and the wales, which were 4 x 6-inch timber, were placed on 2-foot 6-inch centers and held with Richmond Tyscrus using ½-inch bolts.

Batching Plant and Hauling

The contractor set up his own batching plant about 1 mile from the job in the freight yard of the railroad in Bennington. The Erie AggreMeter was fed by a bucket elevator driven by a 2-cylinder LeRoi engine mounted at the top of the bins. The aggregates were delivered by trucks to a feeding hopper over the elevator. A fleet of four 3-batch trucks hauled the weighed aggregates and the five bags of cement per batch.

Pouring Concrete

When pouring the footings a pair of Carter Humdinger pumps and a Novo double diaphragm pump were used to remove the water from the excavation. For the footings, double column piers and beams of the abutments, the 27-E paver was run up on to the approach fill and the concrete chuted to the forms by means of a chute suspended from the paver boom. During this work the concreting crew consisted of the paver operator, the batch man for dumping the trucks, a top chute man and three puddlers who spaded and "walked down" the concrete in the forms.

For pouring the river piers where the paver was located in the stream and could not secure the elevation itself for chuting the concrete, a 60-foot Barber-Greene conveyor with a 24-inch belt and driven by a Waukesha engine was run alongside the paver and the concrete run directly onto the belt and thence up to the forms. No vibrators were used in the concrete nor on the forms for the footings and piers.

Major Quantities and Dimensions

This 30-degree skew I-beam bridge carries a 30-foot roadway with a sidewalk and a reinforced concrete deck. The footings for the piers are 52 feet 2¾ inches long and 7 feet 4 inches wide while the piers are 2 feet shorter and 2 feet narrower at the base. The ends of the rounded nose of the piers are battered ½ inch per foot and the nose radius is 2 feet 8 inches. The sides of the piers are battered the same as the nose. The piers are 20 feet 3 inches high from the footings to the I-beam seats.

The major quantities for this structure were:

Solid rock excavation	300	cubic yards
Common excavation and borrow	34,600	cubic yards
Trench excavation, earth	230	cubic yards
Trench excavation, rock	30	cubic yards
Structure excavation	595	cubic yards
Subbase of gravel, road	5,500	cubic yards
Broken stone base course, road	340	cubic yards
Bituminous surface treatment, road	2,920	square yards
Bituminous material, surface course	400	cubic yards
Oil asphalt	13,200	gallons
Concrete pavement, one course	1,150	cubic yards
Concrete, Class A	612	cubic yards
Reinforcing steel	90,321	pounds
Steel superstructure	473,229	pounds
Reinforced concrete pipe, 12-inch	168	feet
Corrugated galvanized iron pipe, asphalt coated	144	feet
Corrugated galvanized iron pipe, 15-inch	98	feet

Safety Measures

Evidence that the contractor was making every endeavor to insure the safety of the job and the prevention of injury to his workers was shown by the generous use of safety warning posters around the office and supply shed. Printed in red, green and black these posters stood out as a warning to every man to insure his own safety and the safety and lives of his fellow workers by being cautious while on the job.

Among the signs were:

DANGER
Watch Your Step
(Printed in red)

BE CAREFUL
Avoid Nail Injuries
(Printed in green)

Every Injury No Matter How Slight
Must Be Reported at Once
To Your Foreman
(Printed in black)

Personnel

The contract for FAP-25(2) for the approach fills and the bridge on U.S. 7 north of Bennington was awarded to Carlo Bianchi & Co., Inc., of Framingham, Mass., on its low bid of $80,000.72. For the contractor John Brovelli was Superintendent on the road and S. E. Allen was Bridge Superintendent. Merritt Churchill was Resident Engineer for the Vermont Highway Department.

Massachusetts now omits guard rail on the sides of highways where the slope is flatter than 4 to 1 and where the depth from the roadway to the ditch is less than 10 feet, reports George H. Delano, Chief Engineer, Massachusetts Department of Public Works.

GOOD USED EQUIPMENT
For Sale

Lorain shovels, cranes, draglines—from ¾ to 1½ cubic yards.
Jaeger concrete mixers.
Gardner-Denver air compressors, wagon drills, jackhammers.
Euclid and Hug trucks.
Allis-Chalmers L, LO and WK tractors and crawler wagons.
Other miscellaneous equipment. Write to:

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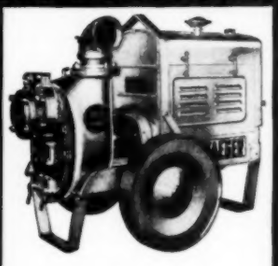

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Left above: A 15 cu. yd. Heil Dig-N-Carry hydraulic scraper in action. These efficient earth movers cut costs to the bone on short haul jobs. Right above: Powerful Heil telescopic hydraulic hoist and 23 cu. yd. heavy-duty Heil rock body. The Heil line includes all types of dump units for all kinds of service. . . . Send for free literature. . . . Address:

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ROAD SCRAPERS · SNOW PLOWS
BOTTLE WASHERS · DEHYDRATORS
OIL BURNERS · WATER SYSTEMS

Avoid Legal Pitfalls

These brief abstracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Edited by A. L. H. STREET, Attorney-at-Law

Paving Contractor Held Subject to License Tax

"City fathers, neither law nor justice back you up in sticking me for occupation taxes, especially while I was performing contracts with you," complained a paving contractor.

"Sorry you feel that way about it, old man, but it does not look that way from where we are standing," replied the city fathers. "Let's let the Georgia Supreme Court decide which of us is right."

Here is the substance of what that tribunal laid down as the law governing the controversy: Since the contractor maintained his headquarters in the city, he was subject to license tax, although part of his operations involved paving jobs in other places. Assuming, without deciding, that the city and the contractor might have legally agreed that there should be deducted from the contract prices for work done for the city amounts equal to license taxes payable by the contractor, as a means of paying the tax, the evidence in this case fails to show that the tax was so taken care of.

A contractor doing work for a municipality or other public body is not entitled to exemption from license taxation on a theory that he is a governmental agency. One who for private gain contracts with a state, Uncle Sam, or any governmental subdivision, does not thereby become immune from taxation upon the business conducted by him. (City of La Grange v. Whitley, 180 S. E. 823.)

Rejection of Materials By Engineer on the Job

Wise were the Texas road contractors who thus hedged their contracts to buy sand and gravel: "It is understood, however, that if at anytime in the operation of the gravel pits, and after using reasonable efforts to obtain satisfactory sand and gravel from said premises, the material should fail to meet the requirements and tests of Owner's Engineer for the purposes intended, parties of first part may cease taking sand and gravel. In which event, parties of the first part shall promptly give notice of the termination of this contract, and shall be liable to party of the second part only for the material actually taken up."

Applying this clause, the Texas Court of Civil Appeals at Fort Worth ruled in the case of McKenzie Construction Co. v. Chanowsky, 86 S. W. 2d, 480:

The contractor would not be liable to the owner of the gravel pit for failure to take sand and gravel rejected by the engineer, although the engineer may have acted wrongfully or fraudulently in making the rejection, unless the contractor conspired with the engineer to bring about the rejection.

The contractor would not be bound to use more than reasonable skill nor extraordinary means to extract and prepare the gravel in such condition as to make it acceptable to the engineer.

The measure of damages for wrongful failure to take sand and gravel in place is the excess of the contract price above its market value in place.

When Structures Collapse

"We decline the nomination," vehemently declared a firm of bridge contractors when the City of Philadelphia attempted to elect them "goat" to bear a loss of $100,794.58, resulting from collapse of falsework. "Your engineers devised the plans and specifications for the falsework on the bridge. We carried them out faithfully, and the cause of the buckling was born in the plans. Our contract with you required us to follow your own engineers' recipe. It was their idea, not ours, to use expansion joints instead of rigid joints. And it was their fault, not ours, that some of the gusset plates couldn't 'take it' when the load of the bridge was put on them."

The city's director of public works, as arbitrator of disputes under the contract, ruled that the contractor was in the clear. But the city stood suit to determine its legal liability.

The Pennsylvania Supreme Court upheld the director's ruling and allowed $81,121.15 to the contractor, the difference between the amount earned for normal work under the contract and $1,770,000, which latter sum the contract specified should be the outside limit on the cost of the job to the city. So, if the contractor was correct in the claim that it cost more than $100,000 to repair the falsework after its collapse, that firm must stand the loss above $81,121.15. On the main point of the case, the Supreme Court said: "A contractor, even though a specialist, who builds according to the owner's plans, is not responsible for the sufficiency of the work." (Canuso v. City of Philadelphia, 192 Atl. 133.)

An Involuntary Santa Claus

When a paving company took four contracts to repair the streets of an Iowa city it did not know that it was making a gift of the job to the city and that it would become embroiled in three unsuccessful suits carried to the supreme court of the state. This is how it all happened:

The company and the city fathers wanted to avoid a statutory requirement that a contract involving more than $5,000 must be let after competitive bidding. They hit upon the idea of splitting the work up into four different contracts for less than $5,000 each, and of calling the work "oiling" instead of repairing. The "oiling" consisted in cleaning the street surface, applying a coat of viscous oil, then a second coat of liquid asphalt and finally a coat of sand.

The idea proved to be a complete failure, because the courts held that no valid contracts were awarded—that the statutory requirement for competitive bidding could not be made a monkey of in this way. (Horrabin Paving Co. v. City of Creston 262 N. W. 480.)

Property owners started the fireworks by suing to enjoin levy of special assessments and issuance of bonds to pay for the job. The injunction was granted. Then the contractor brought two successive suits to compel the city to pay. But the courts turned a "cold shoulder," saying, in effect, "After you let the abutting property owners out of liability by entering into contracts that you ought to have known were illegal, you cannot stick the general taxpayers of the city on an obligation that was never legally or equitably theirs."

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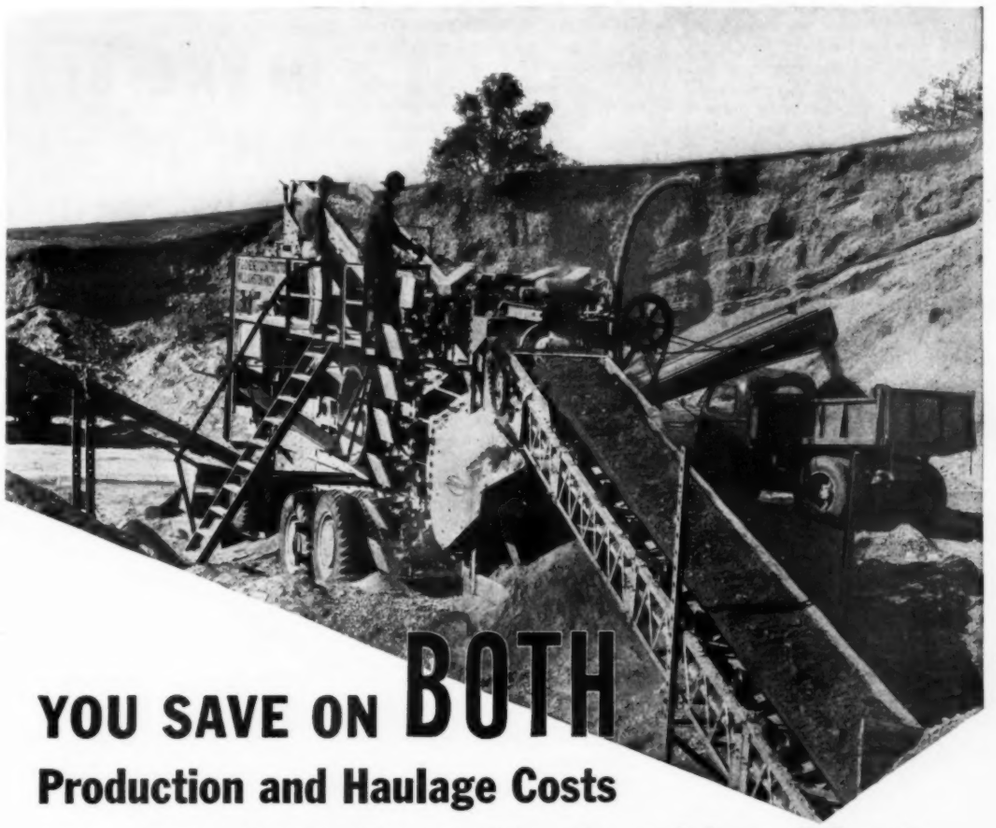

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★ with A-W Portable Crushing Plants

Elimination of haulage is only one of the reasons why A-W Crushers deliver crushed stone and gravel at lowest cost per ton. Says Glen D. Kistler, President, Monmouth Stone Company, Monmouth, Illinois:

"Our total power cost is about 8c per ton. Total production cost, including interest, depreciation, depletion and overhead (including office expense) is about 74c per ton. With our former set-up, production costs averaged about $1.05 per ton."

The experience of Monmouth Stone Company should be of especial interest to any producer. It shows that, under identical conditions, the modern, high-output A-W portable unit provided a saving of more than 25% over the equipment formerly used. Such a production record is no exception to the rule. It is made possible by deep, powerful jaws, operating at highest possible speed; oversize crusher shafts and roller bearings that insure freedom from breakdowns, increase capacity and reduce power cost. Write for full details and further proof of money-saving performance under all operating conditions.

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5-Yard Single Cable Scraper
6-Yard Single Cable Scraper
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12-Yard Hydraulic Scraper

Montana's Storms Require Sturdy Men and Equipment

(*Continued from page 7*)

ers are used as needed.

Except in those cases where snow fence occupies cultivated fields, it remains in place the year around and requires but little maintenance. The initial cost of the fence in place averages between 21 and 22 cents per linear foot and it lasts, when given proper care, for ten years or more. Without the protection which it affords, it would not be feasible to attempt to keep the major part of the mileage of this state free from snow during the winter months.

Incidental to the subject of drifting snow and its control, mention should be made of the fact that plans are now being effected whereby future Federal-Aid highway beautification projects in Montana will include the planting of trees and shrubs at strategic points to serve as permanent snow barriers for the protection of troublesome sections of highway in those cases where this is found to be practicable.

Lastly, but vitally important with reference to the preventive measures followed for the control of snow upon the highways is the matter of weed removal from the shoulders and the side slopes of the roadway. In order that the enemy may be given no hostages, a concerted effort is made by our maintenance forces during the late summer and the early fall months to insure the complete removal of all vegetation adjacent to the road surface which would tend to trap snow. With the completion of this phase of the maintenance operations, the stage is cleared for action and all further responsibilities in connection with the snow situation and its control passes to the shoulders of the field forces who supervise and operate the snow removal equipment.

Organization

For administrative purposes, the Montana Highway Department is subdivided into ten divisions, each with a centrally located shop and office building. Warm storage facilities are provided at all outlying points where snow removal equipment is stationed in order that there may be no delay when the equipment is called into use. In this connection, section headquarters buildings have been erected

A Sand House in McDonald Pass on U. S. Route 10 West of Helena

at the summits of the various mountain passes where the most serious snow difficulties are to be expected.

In addition to housing the personnel of the snow fighting crews, and the equipment which they use, these section houses, situated on lonely stretches of roadway where there are no other habitations, serve as a refuge for motorists who may be in distress for one reason or another. Signs showing the distances to the section houses are in place at one-mile intervals along the highway for a distance of 5 miles each way from these buildings. These signs serve to inform travelers that there is a shelter station ahead for their convenience if needed.

Established telephone connections exist with all of the field maintenance headquarters in order that immediate and complete information on such storm situations and road conditions as may develop at any point upon the state highway system may be sent to the Division offices, and to the Maintenance office at Helena.

Snow removal operations are handled under the direct supervision of the Division Engineers, and their assistants, the Resident Engineers and the Maintenance Foremen. The supervision is handled from the firing line, the engineer or foreman in responsible charge of field activities keeping in constant touch with the snow situation at all times. He shifts snow plows from one critical section to another, as the situation demands; he arranges for the relief crews when necessary; and, in general, he sees that the work progresses in an efficient and economical manner. Not the least of his responsibilities is that of keeping the traveling public fully informed with respect to any changes which may develop in the road situation. During bad storm conditions he puts in exceptionally long hours. The supervision detail calls for experience, stamina, and abundant common sense on the part of the engineer or foreman who handles it.

When a Division or a Resident Engineer selects an operator for a snow removal unit the first questions he asks himself are: "How tough is he?", and "Can he take it?" He knows that the assignment, at one time or another, will call for courage, endurance and determination of the highest order.

Equipment

The snow plows which clear the snow from the roadway vary from the light one-way plows, operated in combination with 1½-ton trucks, to the heavy V-type, and the auger-type rotary plows which are mounted upon 6 to 7-ton four-wheel-drive units. The snow removal equipment operated by the Montana Highway Department includes 99 one-way rigid-type plows on 1½ and 2-ton trucks; 26 one-way reversible-type plows on 1½ and 2-ton trucks; 13 light V-type plows and snow wings, used with 1½ and 2-ton four-wheel-drive trucks; 49 heavy V-type plows and snow wings on 3½ to 7-ton four-wheel-drive trucks; 3 heavy V-type plows and snow wings on Caterpillar Sixty tractors; 3 Roto-blade plows used with 3½ and 5-ton four-wheel-drive trucks; 9 Snow King rotary plows on 3½ and 5-ton four-wheel-drive trucks; and 5 Snogos used with 7-ton four-wheel-drive trucks.

All snow plows and snow wings are equipped with hydraulic lifts. With the exception of the one-way rigid-type plows which are built to Montana Highway Department specifications, the plows used are the standard products of various manufacturers of snow-removal equipment.

The specifications covering the one-way rigid-type snow plow call for a 10-foot moldboard set at an angle of 60 degrees with the centerline of the truck upon which it is to be mounted.

(*Continued on page 28*)

MAKE BIGGER PROFITS IN 1939 with Mall TRADE MARK VIBRATORS

MALL Concrete Vibrator powered with gas engine unit. Runs all day on 1½ to 2 gallons of gasoline.

These powerful, labor saving tools will help you make bigger profits on every contract. You get a dense, watertight concrete job, too—free of aggregate pockets or honeycombs. Your men can place four to five times more concrete compared to hand puddling methods.

The power unit used for vibrating can be used also for dry or wet concrete rubbing, drilling, pumping, sanding, sawing or wire brushing—a multiple-purpose machine.

Without cost or obligation, our engineers or authorized dealer in your territory will gladly help you select the MALL unit best suited for your particular job.

MALL Universal Electric Vibrator. This unit places concrete quickly and is easy to handle and lift through openings in the forms.

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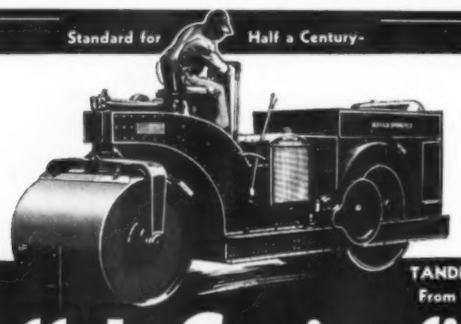

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500 large, airy rooms, newly decorated; many equipped with showers and the latest improvements that will make your stay that much more enjoyable.

All the conveniences and appointments of a fine hotel with sensible rates. Unexcelled cuisine; coffee shop, dining room and the famous Whitcomb Tavern.

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Tractors Now Follow the Horses

Unusual Indoor Job For Road Machines

When the annual Horse Show at Madison Square Garden, New York City, came to a successful conclusion, there was something of a problem at hand to remove 800 cubic yards of earth from the stone parquetry floor, reinforced with brass, and flood and freeze the arena for the winter hockey games. In order to get the earth out and the ice in on time, the Garden officials figured that only four hours could be spent in removing the dirt.

A No. 12 and No. 11 Caterpillar diesel Auto Patrol were sent in by the H. O. Penn Machinery Co., Inc., and the place was bladed clean on schedule. But to accomplish this, the machines had not only to work fast but also very accurately, in order to avoid damaging the floor.

Wide Acceptance of New Series Engines

The three series of engines and power units recently introduced by Hercules Motors Corp., Canton, Ohio, have had unusually widespread acceptance by manufacturers of equipment used in the construction field. The three engines include two models of 2-cylinder gasoline engines and two models of 6-cylinder gasoline engines and three models of 4-cylinder diesel engines.

The new 2-cylinder engines of the NX Series comprise the NXA with a piston displacement of 56.5 cubic inches and the NXB with a displacement of 66.3. These engines are being used by John Deere Co. for tractors, Regal Marine Engine Co. for marine service, Flexible Road Joint Machine Co. for finishers, Byers Machine Co. for its mechanical sweeper, Electric Specialty Co. on a generator set, Trench & Marine Pump Co. and R. B. Carter Co. for pumps, Climax Engineering Co. for a generator set, the Frank G. Hough Co. for a road sweeper, the Jaeger Machine Co. and Knickerbocker Co. for concrete mixers, Kadco Co. for dust removal equipment, and Municipal Supply Co. for tar and asphalt distributors.

The RXL Series of 6-cylinder gasoline engines comprise Models RXLC and RXLD which are being used for truck installations by Oshkosh Motor Truck Co., Inc., Dart Truck Co. and McDonald Truck & Mfg. Co. Other manufacturers include the Thermal Engineering Co. for generators, Chicago Pneumatic Tool Co. for compressors, and the Buckeye Traction Ditcher Co. for excavating equipment.

The Hercules diesel DOO Series comprises Models DOOB, DOOC and DOOD. These 4-cylinder engines are being used by Ford Motor Co. for motor trucks, the Cleveland Tractor Co. on crawler tractors, U.S. Motors for generator sets, Avery Farm Machinery Co., Inc. for tractors, Lincoln Electric Co. for electric welders, Marmon-Herrington Co. on its high-speed tractor, Baldwin Locomotive Co. on industrial locomotives, Galion Iron Works & Mfg. Co. and Austin-Western Road Machinery Co. on road rollers, Federal Motor Truck Co. on motor trucks, Bay City Shovel Co. for power shovels, and the Jaeger Machine Co. for pumps.

The latest Hercules development is the 4-cylinder Hercules Model DOOC diesel as a replacement for the Ford V-8 truck gasoline engine. This engine is available in a standardized unit-package with all parts needed for full diesel conversion of Ford V-8 trucks for 1935 to 1939 inclusive. It is arranged with a special flywheel housing to fit the Ford transmission and is equipped with a special type of front gear cover with supporting arms which duplicate the Ford V-8 front engine mounting. No major changes are required in the Ford V-8 chassis, frame or dash assembly and these engines are available for either right-hand or left-hand drive.

New Willett Company Announces New Equipment

The Willett Mfg. Co., 169 Monroe Ave., N. W., Grand Rapids, Mich., successor to the Willett Mfg. Corp. of Plymouth, Ind., has announced that it will continue to manufacture Willett underbody truck scrapers, snowplows and blades and will maintain a complete stock of replacement and repair parts for all Willett road machinery now in use at its Grand Rapids headquarters.

Another announcement by this company is that it has developed and will soon place on the market an improved type of underbody truck scraper with a number of new features.

New Wire Rope Has Lubricating Element

Because of the importance of proper lubrication to secure longer wire-rope life, one of the features of the Gilmore wire rope now being manufactured at the Gilmore Wire Rope Division, Jones & Laughlin Steel Corp., Muncy, Penna., is its positive lubricating element.

Other features of this new wire rope include the method of pre-forming known as Permaset and the use of an identification tape in the core of Gilmore rope. The use of this tape eliminates the need of painting a strand of the rope for identification.

Complete information on Gilmore wire rope which is designed to meet every wire rope need may be secured by interested contractors and engineers direct from the manufacturer by mentioning this item.

Carrying Heavy Loads

The various types of Fruehauf trailers for transporting heavy machinery and materials are described and illustrated in a new folder "Cutting Costs for Contractors" recently issued by the Fruehauf Trailer Co., 10928 Harper Ave., Detroit, Mich. Fruehauf trailers transporting loads of cement, bridge sections, machinery, pipe and tanks are shown, as well as special dump trailers and gravel spreaders.

Copies of this folder may be secured by interested contractors and state and county highway engineers direct from the manufacturer.

AMAZING NEW FREE-FLOW FITTING

1 FULL VOLUME!
2 CAN'T CLOG!
3 CAN'T LEAK!
4 CASE HARDENED!

Alemite Volume Gun Model 6541

"FREE-FLOW"—that's the accurate way to describe this amazing new type Alemite Giant Button Head Fitting! It belongs on every heavy duty machine bearing *where a large volume of lubricant under pressure is required,* as on tractor track rolls.

With the newly designed valve plunger, little effort is needed to introduce a full FREE FLOW of lubricant—*no pressure is wasted in opening the fitting.* The valve plunger can't tip, and its bridge-shaped design assures FREE FLOW of lubricant through the slotted passage and down through the center of the spring.

Because the valve plunger must come to a positive stop at the bottom of the opening, there can be no over stressing, bending, or breaking of the spring. *THIS FITTING CAN'T JAM OR CLOG!* Valve plunger snaps back instantly to closed position as soon as pressure is released. And the top of the fitting is case hardened to withstand the punishment of heavy duty service—smooth to give coupling seal longer life without leakage.

Mail the coupon for complete information.

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THIS ALEMITE PORTABLE SERVICE STATION *is the modern answer to the demand for power lubrication out on construction jobs. Pumps lubricant direct from original drums. Also inflates tires.*

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Equipment for Fighting Winter Snows and Ice

The Good Roads line of snow-removal and ice-control equipment is described in a new series of bulletins and a 68-page snow plow catalog No. 102 recently issued by the Good Roads Machinery Corp., Kennett Square, Penna. Good Roads Champion snow plows and wings with full power hydraulic control for mounting on 1½ to 2-ton trucks are described and illustrated in Bulletin 11138. Full power hydraulic control is also a feature of the heavier Champion models for use with 5 to 10-ton trucks covered in Bulletin 2838.

For sleet and ice-covered roads, there is the Model 2S Life Saver sand, chip and chloride spreader of the hopper type mounted on two tired wheels, or various bin-type models, all of which are described and illustrated in Bulletin 1938.

Copies of any or all of these bulletins and the catalog may be secured by interested state and county highway engineers direct from the manufacturer by mentioning this item, or from this magazine.

Bay City Distributors

With more machines having been shipped during 1938 than in any previous year of its twenty-five years of building excavating equipment, Bay City Shovels, Inc., Bay City, Mich., has announced three new dealer appointments. Henry H. Meyer Co., Inc., 110 S. Howard St., Baltimore, Md., will represent Bay City in Maryland, District of Columbia and the four northern counties of Virginia; the State Equipment Co., 25 Third St., Parkersburg, W. Va., will handle the complete Bay City line in West Virginia, except Hancock, Brooke, Ohio and Marshal counties; Long-Lewis Hardware Co., Bessemer, Ala., has been appointed distributor for central Alabama; and General Supply Co. of Canada, with offices in Montreal, Toronto and Ottawa, has added the Province of Quebec to its territory for the complete line of Bay City equipment.

ROAD CONTRACTOR SAVES 4 TO 7 GALLONS OF GASOLINE PER DAY ON EACH TRUCK

● IT'S EASY to lean down a carburetor, and increase gasoline mileage. But that merely results in loss of power and burned valves, increasing maintenance expense far more than the gasoline saving.

Standard Oil Automotive Engineers are trying to reduce *total* operating costs. Sometimes it means readjustment of a carburetor float level. Sometimes it's refacing a set of distributor points. Sometimes it's a new condenser. But in every case it involves a careful check of all of these things and many others to secure good overall performance, full power, low maintenance, with the lowest possible *total* cost. And that's what affects your profits.

The saving of 4 to 7 gallons of gasoline per day per truck made for an Indiana road contractor is typical of the results accomplished by these Engineers in almost every instance where this *thorough* Automotive Service is rendered.

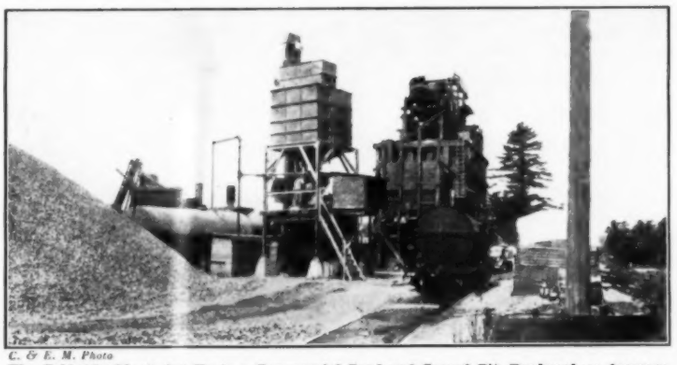
Use Standard Oil products. Get this free Engineering Service and watch *your* fleet operating costs come down. Write 910 S. Michigan Ave., Chicago, Ill. Ask to have the Automotive Engineer nearest your garage call and explain fully just what he does.

Standard Automotive Engineer and Garage superintendent inspecting carburetor float. Close cooperation with shop men on their operating problems insures the lasting value of Standard's Automotive Engineering Service.

Copr. 1939, Standard Oil Co. (Ind.)

STANDARD OIL COMPANY (INDIANA)

AUTOMOTIVE ENGINEERING SERVICE LOWERS MILEAGE COSTS



C. & E. M. Photo

The Cold-Mix Plant, Set Up in a Commercial Sand and Gravel Pit, Produced an Average of 275 Tons of Surface Course Material Daily

N. H. Cold-Mix Top On Waterbound Base

(*Continued from page* 18)

form by two men who did all the weighing and dumping of the batches. The materials were placed in the pug mill operated by a 50-hp motor in the following order, aggregates, liquefier, asphalt and lime. The total time for mixing each 1½-ton batch was 3½ minutes of which 1½ minutes was with the asphalt and lime in the batch. The plant was operated 11½ hours daily during the contract, producing an average of 275 tons daily.

The weights of the materials in the base and top batches were as follows:

WEIGHT IN POUNDS

	Base	Top
1¼-inch stone	2,100	....
⅝ to ⅜-inch stone	....	2,350
⅜-inch stone	600	....
Sand	300	500
Lime	15	10
Liquefier	2½ gals.	2½ gals.
Asphalt	110	155
Total weights (exclusive of liquefier)	3,125	3,015

Spreading the Cold Mix

The grading on this project was started late in the fall of 1937 and the seepage course completed for a sufficient distance so that the spreading of the bituminous concrete surface courses could begin June 24, 1938, and be completed by August 5, 1938. A fleet of metal-lined trucks hired locally and averaging about eleven trucks was used for the 12-mile haul to the road. They hauled three and four 1½-ton batches per load. The truck bodies were oiled with fuel oil before loading for each trip. All outgoing loads were weighed on standard Fairbanks platform scales at the plant and the truck driver given triplicate tickets, one of which was collected by the asphalt contractor at the spreader, the second retained as a receipt by the truck driver for payment and the third returned to the plant foreman.

The cold mix was spread 22 feet wide on the 24-foot waterbound macadam base. The base was allowed to be slightly damp so as to chill the loads when spread as the 135-degree temperature was too high for satisfactory spreading or rolling without creeping under the 14-ton Buffalo-Springfield 3-axle tandem roller. The trucks dumped the loads progressively into the hopper of a Jaeger bituminous paver which spread the material 11 feet wide. The operator directed the dumping of the trucks into the hopper and one raker on the inside kept the material even at the joint line. While laying the first strip of the fine mix, a man on the outside moved the outside wing in or out to spread the material to a chalked line that was laid out on the course mix while the other wing man carried material back for the raker. When laying the second strip, it was necessary to have a man on each wing, moving the wings in or out, the one on the inside to meet the inside joint and the outside wing man to meet the chalked line on the base course. After the wings were once adjusted, it was very seldom necessary that they be raised or lowered but the wing men spent most of their time moving them in or out to get the required width.

The base or binder course of coarser stone was spread 2¾ inches thick for the compacted 2-inch layer required and the top was spread 1¼ inches thick for the 1-inch surface course specified. While the cold mix was spread 11 feet wide it was rolled only 10 feet wide so as to improve the joint when the second strip was spread. The procedure was as follows: a strip 600 feet long was spread on one side for the 11-foot width and rolled the 10-foot width, leaving the unrolled strip on the inside. Then the machine went back and spread 1,200 feet on the other side so that the roller could roll the joint for the first 600 feet. In this way the work went down the road staggering the laying for 1,200-foot lengths. No traffic, either of the contractor or public, was permitted to cross the unrolled 1-foot strip against the joint. The batch trucks drove back to where the strip had been rolled completely and then backed to the spreader.

The cross section of the surface required 44 tons per station 22 feet wide for the two courses. The contractor laid base on one side for one day and then base on the other side the next day and the third day spread the surface on both sides, thus completing about 1,800 feet of pavement in three days.

Personnel

The contract for the 3 miles of cold-mix surface on a waterbound macadam base on N. H. Route 101 east of Peterborough was awarded to John Iafolla of Dedham, Mass., and John McCourt Co. of Boston, Mass., on their low bid of $139,866.25. Eugene Chitvanni was Superintendent for Iafolla and Tom McCourt acted as his own Superintendent on the job. For the New Hampshire Highway Department Stanley Morrill was Resident Engineer on the bituminous surfacing and William H. Nelson was Resident Engineer on the grading and waterbound macadam.

Tandem-Drive Axle Units

Timken 352 and 452 series tandem-drive axle units are designed for the heavy-duty class of 6-wheel motor vehicles using two rear driving axles, to increase traction and the power of the drive unit. These two series are identical in design and construction, differing only in the dimensional details affected by their capacities. Both are of the load-equalizing spring suspension type whereby the spring acts as the load equalizer between the two driving axles.

Copies of four-page Bulletin S. P. 3724, describing and illustrating the features of these tandem drive axle units, may be secured by those interested direct from the Timken-Detroit Axle Co., Detroit, Mich., or from this magazine.

FOR A REAL BLADING JOB
CALL ON GALION MOTOR GRADERS

Here you have actual proof that Galion motor graders can do a real job of spreading and leveling material. Here you see two Galion graders of the "master diesel" type, equipped with double drive (eight tires in rear) and hydraulic control.

Pull type graders
Motor patrol graders
Maintainers
3-wheel & tandem rollers
Portable & trench rollers
Spreaders
Sanders Drags

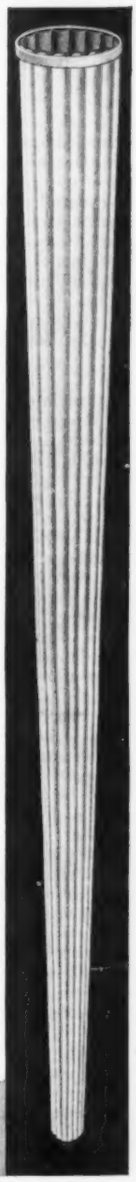
We would like to tell you more about this type of motor grader and what it can do for you in the way of road building and maintenance. Let Galion road machinery enter into your 1939 program . . . there is a unit in the broad line to do the job right.

GALION ROAD MACHINERY

The Galion Iron Works & Mfg. Co.

Main Office & Works: Galion, Ohio
Export Division: Columbus, Ohio

SPEED UP JOBS WITH UNION METAL *Fluted Monotube* PILES



• Do you want to speed up your piling jobs? Then specify Union Metal Fluted Monotubes. These piles are easier to handle; drive faster; take less blows; and require a minimum of equipment for installation.

The reason? Fluted Monotubes are fabricated by the cold rolling process, which makes possible the use of lighter gauge metal to obtain a pile of greatly reduced weight without sacrifice of strength. You can roll these piles off the car or truck and drag them into position. Drive them without core or mandrel. They have the ruggedness and rigidity to take it. And as for equipment—a mobile crawler crane, leads, and hammer are all you need for a fast, efficient driving operation.

Scores of engineers and contractors have saved time and money by using Fluted Monotubes for cast-in-place concrete piles. Better get the facts. Write for new illustrated catalog containing complete engineering data.

THE UNION METAL MANUFACTURING CO.
CANTON, OHIO

CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Avenue, New York

Enclosed is my remittance of $2 for the next twelve issues of CONTRACTORS AND ENGINEERS MONTHLY.

Name _____

Position _____
(Or Type of Business)

Address _____

(City) _____

N. B. A two dollar bill, check or postage stamps will be entirely acceptable.

Bridge Inventory Benefits County

(*Continued from page 8*)

way bridge of limited carrying capacity which is posted for limited loads is marked with a red pin.

Colored tabs, similar to these colored pins, are used on the bridge inventory cards, clipped on the lower right hand corner in the space noted as "Condition." These enable quick check on the condition of all bridges from the flat files.

All bridge design in Dutchess County is handled by the county highway bridge unit. One new 106-foot through-girder bridge was recently built and in 1936 the county built its first two rigid-span concrete structures of 69 and 60-foot spans. Soon contracts are to be let for a 100-foot three-span concrete structure with cantilevered ends. Dutchess County has used Irving open steel decking on five of its bridges and for the cantilevered sidewalks on one bridge.

The Office Unit

The main offices of the County Highway Department are now located in the Dutchess County Court House in the center of Poughkeepsie. Plans have been made to build a Highway Department office at the County Highway Garage located about 2 miles from the center of Poughkeepsie. This location would be preferable for the handling of equipment in times of emergency, although not as convenient to other county officials.

The office unit consists of a Chief Clerk in charge of the office and a staff of five who handle all purchasing and maintain all county highway records other than the strictly engineering records. Excellent use is made of large bulletin boards not only in the office of the County Superintendent of Highways, but in the corridor running between all other highway department offices, on which are posted all notices, comparative cost graphs and other pertinent information of value to all members of the organization. The main office contains the key maps of bridge locations, as well as duplicate maps showing the studies of equipment performance such as mowing and snow plowing. Modern office equipment is used throughout, with adequate files.

The County Garage

The county garage is located about 2 miles east of the County Court House on a main state highway. It is a brick building, well-lighted by means of large steel sash windows and has a flat built-up asbestos roof supported by steel trusses. It measures about 160 x 80 feet with a 20 x 30-foot addition on the front containing the stockroom, office, toilet and boiler room. This section will be a connecting link between the garage proper and the proposed county highway offices. The boiler room contains a Kewanee steam boiler, an Ingersoll-Rand 30 two-

(*Concluded on page 30*)

The Marmon-Herrington All-Wheel-Drive Special Marsh Buggy

Special Marsh Buggy In 1939 Truck Line

Among the 1939 models of the all-wheel-drive trucks manufactured by the Marmon-Herrington Co., Inc., Indianapolis, Ind., is a new special model of an all-wheel-drive marsh buggy, designed to haul passengers and equipment through previously impenetrable swamps and similar terrain.

This unit consists of a Marmon-Herrington all-wheel-drive Ford truck, especially engineered to accommodate the mounting of from four to ten 13.50 x 24 tires. The number of the tires furnished varies in accordance with the type of terrain in which the vehicle is to operate. Special engineering was necessary to provide the proper axles and gear ratio for these extremely large wheels, and structural changes were necessary on the truck chassis. This buggy combines the tractive ability of Marmon-Herrington all-wheel-drive, applied to the enormous tire surface of the ten big tires, with the floating effect gained by the tires. Thus, the vehicle seems to paddle its way across marshland which can not be traveled by any standard type of vehicle.

The Marmon-Herrington Co. builds a complete line of four and six-wheel all-wheel-drive trucks and truck-tractors with load capacities up to 25 tons and, in addition, converts all types of Ford trucks and cars to all-wheel-drive.

New Tested Method Of Pile Construction

By the use of Union Metal Fluted Monotube piles a new and simplified method of pile construction has been developed. With their use it is possible to cast in place a concrete pile that meets the specified engineering requirements without guesswork. Tapered steel Monotube piles are designed and fabricated for maximum strength and bearing area so as to sustain the usual load value with a high factor of safety.

Catalog No. 68, issued by The Union Metal Mfg. Co., Canton, Ohio, has recently been issued to give complete information on these piles, including load tests and their uses in many different types of construction, as well as specifications, diagrams and illustrations of actual installations. Copies of this catalog may be secured from the manufacturer by mentioning this item, or through CONTRACTORS AND ENGINEERS MONTHLY.

Hard-Surfacing Rods

The use of Amsco No. 459 welding rods for hard-surfacing dipper teeth, grader blades, scarifiers and other equipment subjected to abrasion and hard wear is discussed in a new folder recently issued by the American Manganese Steel Div., American Brake Shoe & Foundry Co., Chicago Heights, Ill. These rods, which may be used for both acetylene and electric welding, are available bare or coated in 3/16, ¼ and 5/16-inch diameters, in lengths ranging from 7 to 10 inches for smaller diameters to 15 inches for the 5/16-inch size.

Contractors and state and county highway engineers, interested in providing longer life for the parts of their equipment subjected to particularly hard wear, may secure copies of this new folder and complete details on Amsco welding rods direct from the manufacturer, or from this magazine.

Stabilization of gravel roads reduces the gravel loss 67 per cent, according to 1938 Highway Research Board discussion.

LATEST IN HOISTS

30 to 50 H. P. JAEGER HOISTS NOW OFFER

- Touch Control thru Giant Expanding Frictions or Clutches.
- Timken Self-Aligning Bearings.
- Combined Side Frames and Base, All-Steel, Lighter, Stronger.
- Self-Starters, up to 8 Cyl. Power, many Jaeger improvements — all at ASTONISHINGLY LOW PRICES!

OTHER SIZES 10 TO 100 H.P. — Most modern hoists on market—single, double, three drums, gas or electric. Send for Catalog.

THE JAEGER MACHINE CO.
701 Dublin Ave. Columbus, Ohio

JAEGER

EQUIPMENT FOR CONTRACTORS

Construction records are climbing .... 1939 will be a big year for contractors. Equipment owners can boost their profits by choosing Lansing Products — always known for dependability and built-in stability. Look to this line —for a wise investment.

A Line that has the reputation of nearly six decades of successful manufacturing to back it up. Write nearest branch or headquarters for complete information, costs, etc. TODAY.

Lansing F-2S Wheelbarrow. Standard or Pneumatic Rubber Tired Wheels

Lansing Mortar Box

Lansing 3½-T Trailer Mixer

1939 WILL BE A BIG YEAR FOR USERS OF LANSING COMPANY EQUIPMENT

LANSING 10-S MIXER
1-Man Control—12-H.P. LeRoi Engine—Hyatt Bearings

Capacity 10 cu. ft. per batch

CHECK THIS VALUE!

K-1 Concrete Cart

Lansing K-4 Concrete Cart with Pneumatic Tired Wheels

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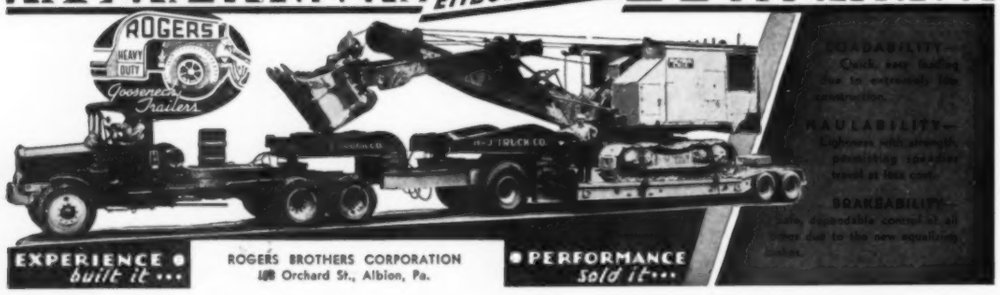
MINNEAPOLIS CHICAGO NEW YORK BOSTON KANSAS CITY PHILADELPHIA SAN FRANCISCO

• BUILT • FOR • STABILITY • SINCE • 1881 •

ROGERS TRAILERS EMBODY THESE 3 ESSENTIALS



EXPERIENCE built it ... | ROGERS BROTHERS CORPORATION 1081 Orchard St., Albion, Pa. | PERFORMANCE sold it ...

HOTEL CHELSEA
RIGHT ON THE BOARDWALK
ATLANTIC CITY

For Recreation Or Relaxation Choose the Chelsea

FROM $6 WITH MEALS & BATH
$3 ROOM ONLY & BATH Per Person 2 in a Room

Here you will find everything to further your comfort and enjoyment—outside ocean-view rooms ... sun deck ... beautiful dining room at the ocean's edge ... superb cuisine ... varied sports ... and entertainment. You'll like your fellow guests ... and the delightfully friendly atmosphere of The Chelsea.

SPECIAL WEEKLY RATES

JOEL HILLMAN • A. CHRISTIAN MYERS • JULIAN A. HILLMAN

The New Adams 302 Motor Grader

New Motor Grader Also Backslopes

A new medium-size motor grader, capable of building and maintaining roads from bank to bank, including backsloping, has just been announced by the J. D. Adams Co., Indianapolis, Ind.

The new No. 302 is similar in design to the large Adams heavy-duty motor graders and has many of the same features of design and construction. It has the Adams monomember frame which allows for better blade visibility and a wider range of blade positions, according to the manufacturer. It is also claimed that this is the first motor grader of this size on which the blade can be swung outward to cut high or low backslopes. Another feature of this machine is its balanced weight so that more pressure can be exerted on both blade and scarifier, without affecting traction.

The No. 302 is powered by the improved International I-30 tractor, with a 45.5-hp engine. Three types of drives are offered: two-wheel drive with dual or single tires for maintenance work and Adams four-wheel tandem drive to provide maximum traction for all types of work. Optional equipment includes leaning front wheels, scarifier, canopy top, cab enclosure, starting and lighting equipment, and V-type snow plow and snow wing.

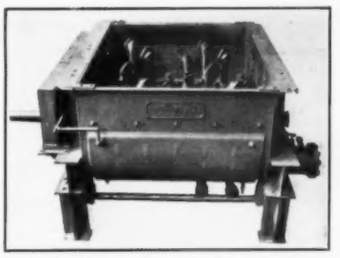
Complete details on this new grader which is designed for use by county and state highway departments and by contractors are contained in a new catalog, copies of which may be secured direct from the manufacturer.

New 4,000-Pound Mixer For Asphalt Batches

A new 4,000-pound capacity mixer designed to meet the demand for an economically priced 2-ton asphalt batch mixer has been announced by The F. D. Cummer & Son Co., 900 Keith Bldg., Cleveland, Ohio. This pugmill-type mixer will handle either hot or cold-mix material and is steam-jacketed for hot-mix work. It is lined with manganese steel liners made in eight pieces and has a manganese steel steam-operated gate providing clear openings when in the discharge position.

The new mixer is built with an 8-inch H-beam bed plate at either end, on which the self-aligning Shafer roller bearings are mounted, removing the strain from the mixer ends. The shafts carrying the two-piece teeth are nickel steel forgings. The teeth consist of steel shanks and patented Cumzite adjustable tips which may be given a rotary or endwise adjustment, resulting in more economical mixing.

Complete information and prices on this new large-capacity pugmill mixer may be secured direct from the manufacturer by mentioning this item or through CONTRACTORS AND ENGINEERS MONTHLY.



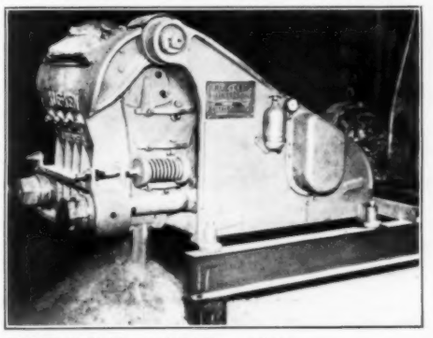
Top Elevation of the Cummer Mixer Showing the Sherical Mixer Teeth With Cumzite Tips

New Bulletin Shows Wagon Scrapers on Unusual Jobs

To supplement its recent bulletin on road building jobs, the Continental Roll & Steel Foundry Co., Tractor Equipment Division, East Chicago, Ind., has recently issued an interesting bulletin showing Continental 4, 5, 7 and 10-yard wagon scrapers at work on golf course and airport leveling, truck loading and a host of other unusual scraper jobs.

Copies of this bulletin entitled "For Unusual Jobs Too!" may be secured by interested contractors and state and county highway engineers direct from the manufacturer or from this magazine.

CRUSH WITHOUT ABRASION!
BY USING A NEW AND BETTER PRINCIPLE
KUE-KEN BALANCED CRUSHER. CRUSHES FASTER AND FINER WITHOUT ABRASION.



In the KUE-KEN balanced crusher the pendulum-type jaws move toward each other and downward with the rock stream. No rubbing or abrasion, therefore less wear and lower cost crushing.

The KUE-KEN crushes large rocks very fine at a single pass. The No. 50 KUE-KEN illustrated is crushing 50 to 90 lb. chunks to ¼" jaw setting at the rate of 13 tons an hour. The same machine will crush 55 tons per hour to 3" jaw setting.

The KUE-KEN crusher has a quick and fool-proof adjusting device to make a fine product with maximum "fines" or a coarse product with aluminum "dust."

Balanced! Operates without foundations—sealed oil bath lubrication—eliminates wear.

Write today for Bulletin No. 600 giving details of the KUE-KEN balanced crusher and free crushing tests.

STRAUB MFG. CO. 532 CHESTNUT ST., OAKLAND, CALIF.

STEP UP YARDAGE with MARION

STURDY

Today, more than ever before, you need an excavator that is faster and more dependable. It is a fact that major contracts are being awarded to contractors who are basing their bids on what they know they can do with modern equipment. • • • Consider MARION excavators in this light. They are built to give you maximum yardage at low operating cost. They incorporate many new and modern features that simplify the biggest and toughest of earth moving jobs. They are the ultimate in dependable operation . . . proven performance. • Compare the new, modern MARION, point for point, with any machine of its size on the market. Contractors who have, choose Marion.

THE MARION STEAM SHOVEL CO.
MARION, OHIO, U. S. A.

CRANES • DRAGLINES • SHOVELS
CLAMSHELLS • PULL SHOVELS

FAST

Ferguson & Edmonson Co. Pittsburgh, Pa.
TWO MODERN MARIONS are owned and operated by the above company and are used extensively on general contracting.

The Arundel Corporation Baltimore, Md.
This company has MODERNIZED with MARIONS. Three modern Marions are being used on major construction contracts.

Dolese & Shepard Company Chicago, Illinois
The importance of Modernizing with Marions is reflected in the TWO Modern Marions now being used by the above company.

MODERNIZE WITH MARIONS FROM 3/4 CU. YARDS UP

Write for bulletins describing the size of Marion in which you are particularly interested. If you are not receiving THE GROUND-HOG regularly, ask to be put on the mailing list. • • •

One of Montana's Snogos Taking a Slice Off a Drift on a State Highway

Winter Maintenance Of Montana's Roads

(*Continued from page 22*)

The moldboard of 10-gage steel plate, adequately reinforced, is rolled the entire length from the bottom upward to a 22-inch radius to form a 34.55-inch arc, thence rolled to a 9¼-inch radius to form a cowl of 7¼-inch arc at the left or forward end, which cowl is uniformly increased in width to a 14.5-inch arc of 9¼-inch radius at the right, or discharge end. The chord of the 34.55-inch arc occupies a vertical position when the plow is in operation.

This plow, equipped with a hydraulic lift, resting upon four evenly spaced shoes, and mounted upon a 1½-ton truck, makes an efficient and economical unit. It represents the results of several years' experiments in developing a light snow plow suitable to the needs of this state. The peculiar roll of the moldboard is such that the discharge velocity of the snow is accelerated when the plow is operated at higher speeds, together with an absence of any snow being thrown into the air in advance of the truck to cloud the vision of the truck driver.

Normally the one-way plows, operated at a speed of 25 to 30 miles per hour, are capable of handling the snow situation over the greater part of the state highway mileage. We find them to be most efficient in fresh snow having a depth not exceeding 6 or 8 inches. The secret is to have the plows on the road with the advent of the storm, and to keep them there, patrolling their assigned sections, until the storm has subsided. The design of the moldboard makes it possible for these units, when operated at the higher speeds, to throw the snow well to the side of the right-of-way. There is no difference in performance between the one-way rigid and the reversible one-way plows other than that the latter are naturally more efficient upon side-hill sections of roadway where the snow can be thrown to the one side only.

When the snowfalls are of considerable depth and when there are drifts to be cleared, the V-type plows are used. With an operating speed under average conditions of 18 to 25 miles per hour for the lighter units, and of from 10 to 18 miles per hour for the heavier units, much mileage can be covered by these plows in a short time when the occasion demands.

Just what particular design of V-type snow plow is best depends upon the varying snow conditions encountered in different localities and the Montana Highway Department is now conducting experiments in an effort to determine further those designs which are most suited to our purposes. Our investigations to date indicate that a plow capable of being operated at a comparatively high rate of speed and throwing the snow to the side without too much lifting action is more adaptable to eastern Montana conditions, where the snowfall is lighter, and the snow is of less moisture content than is the case in the western part of the state. In the latter area where deeper drifts of wet and frozen snow are experienced, our operators favor a slower moving plow which is designed to exert a lifting and rolling effect upon the snow at the same time. Our Equipment Division is continuing its studies is an endeavor either to find or design a V-type plow which will serve to the best advantage under any and all conditions.

We consider a snow wing, mounted upon the right side of the truck, an essential auxiliary arm for use with all V-type plow units. The wings are invaluable for widening purposes, particularly in loose or soft snow, as they reach out well beyond the path of the snow plow proper, sweeping into the side ditches such snow as would otherwise be left upon the shoulders of the roadway.

The Caterpillar Sixties with V plows and snow wings are stationed in readiness for use upon mountainous sections of highway if needed. They are sturdy units for breaking a way through heavy drifts and for opening up in the spring of the year those roads which were not kept open to travel during the winter months. When snow slides occur, as they occasionally do, burying the roadway under snow and rock debris, the Caterpillars, equipped with bulldozers, outrank all other types of equipment, shovels excepted, in clearing the slide material from the road surface.

Of late years, since the adoption of the heavier truck tractors for snow removal, the crawler tractors have been used less and less for this purpose.

For mopping up operations, particularly in those cases where side ditches are narrow or where guard rail interferes with the bucking of ridged snow from the roadway, necessitating the use of blower equipment, the rotor-blade plows working together with the one-way or V-type plows are especially useful. We find them to be quite capable of a complete snow removal operation in their own right, provided the drifts encountered are not too deep.

The equipment which is held in reserve for emergency use during bad storms, or upon stretches of roadway where chronic trouble is apt to be experienced, include the fan and the auger-type rotary plows. These units are expensive to operate, and are not ordinarily used except as a last resort. During severe storms, however, they more than pay for their keep, constituting the final insurance which the Highway Department has against blocked road conditions. Fortunately for the maintenance budget, the occasions when they have to be used for any prolonged periods are comparatively rare.

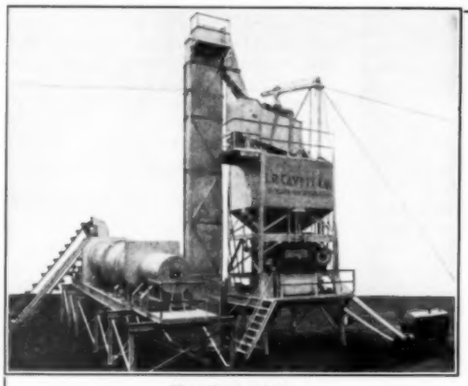
We have yet to find any snow condition upon Montana's highways which the auger-type rotary snow plow is incapable of handling. It is comforting to have a few of them around, available for assignment in those cases where the situation becomes too tough. Their power to blow the snow from through cuts completely off of the right-of-way, thus avoiding the saturation of the roadbed in the spring of the year, saves the state many thousands of dollars which would otherwise have to be spent for road surface repairs.

Ice and Slides

Other winter maintenance work includes the sanding of icy road surfaces at critical points, and the frequent patrolling of those mountain stretches of highway where slides are to be expected. Icy road conditions are infrequent upon Montana highways except in the shaded canyon and forest sections, and upon the higher mountain passes. Slides are most apt to be experienced during wet weather periods, and following pronounced thaws. Hazards of this nature are promptly eliminated or placed under control and traffic is seldom seriously inconvenienced.

All major changes in road conditions upon the state highway system are reported from the field to the Helena office at once. The Maintenance Office is thus able to give authentic road information at all times, week-ends included, to those who inquire. Road condition data concerning hazardous features, or roads which are temporarily closed to traffic, are compiled each day during the winter months and given to the radio stations of the state for broadcasting. This same information, corrected to the hour of release to meet changing conditions, is given to the Associated Press and to the United Press for publication in all of the daily papers of the state. A complete report covering the condition of all roads in the state highway system is given to the Press organizations Saturday morning of each week, which data is published for the informa-

(*Concluded on next page*)



PORTABILITY and CAPACITY COMBINED IN THE NEW MODEL P-A PORTABLE ASPHALT MIXING PLANT

Manufactured by
HETHERINGTON & BERNER Inc.
INDIANAPOLIS, IND.

Write for Particulars Bulletin T-260

MB Center Line ROAD MARKER

Light-weight, compact, patented "moving stencil" easily attached to any car or truck. Provides clean, straight center line, free from feather edge.

MARKS 65 to 75 MILES DAILY

on even or uneven surfaced roads—concrete or black top—using any kind of paint or hot asphalt. Two continuous bands form outline of spray. No air compressor required. Pressure is controlled by specially designed pump.

SAFE! *Keeps Men off the Highways*

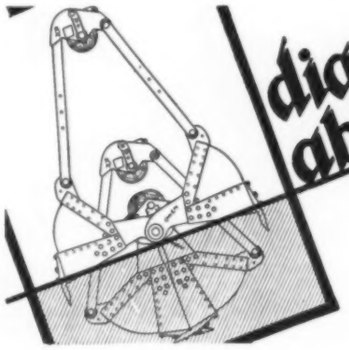
SPEEDS UP JOB — REDUCES COSTS

Guide on front bumper enables driver to accurately direct movement of vehicle. No men required on road for marking. The M-B Marker eliminates accidents. Reduces costs. Endorsed by engineers and highway commissioners everywhere. Write for bulletin.

Manufactured by
MEILI-BLUMBERG CORP., Box C-1, New Holstein, Wis.

MEILI-BLUMBERG
AGRICULTURAL and INDUSTRIAL EQUIPMENT

A 2279



digging ability is an inherent characteristic of every Owen Bucket.

Exceptional digging ability gained the original acceptance for Owen Buckets and has maintained its position of leadership throughout the years. To this desirable attribute add uncommon durability and great versatility and you have the bucket that pays the largest dividends in proportion to investment.

Get the Owen Catalog.

The OWEN BUCKET Co.
4030 Breakwater Ave., Cleveland, Ohio
Branches: New York Philadelphia Chicago Berkeley, Cal.

A MOUTHFUL AT EVERY BITE

Careful Planning Licks Snow and Ice

(*Continued from preceding page*)

tion of those who plan motor trips over the week-end.

Emergencies

Usually each winter there comes a time when all maintenance forces are called out to combat especially severe storm conditions. The thermometer stands at 40 or 50 degrees below zero; a gale is blowing; snow is falling; there is no such a thing as visibility. The snow plows punch their way through the blizzard, registering progress only through virtue of the sound judgment and the stout hearts of their operators. There is no turning back. There may be engine trouble which is repaired in the field with frozen fingers. Perhaps the relief crews are unavoidably late in arriving, but the snow plows continue to shove their way into the snow banks ahead. The road is opened, a stranded car is pulled from the ditch and its occupants sent upon their way (usually without chains, a shovel, overshoes, or warm winter clothing); traffic proceeds. If you should tell the operators that their performance was something unusually fine, they would give you the good old army "razz." It is simply routine work to them, no citations being called for.

It is to the credit of our field operators that we have no record in this state of any case of a motorist freezing to death or suffering really serious effects from exposure because of being snowbound upon a state highway.

During severe winter conditions, and at night, all snow plow units are manned by two operators. This is usually essential to the proper handling of the work, as well as necessary for the protection of the personnel in case of accident. Light plows on patrol, or operating under fair weather conditions, carry but one operator during daylight hours.

The experienced snow removal operator gives his work all of the possible breaks. He shifts a section of snow fence from a field high with grain stubble to a windswept summer-fallowed area nearby where bad drifting conditions are to be expected. He flags, in advance of winter storms, the shoulders of side-hill stretches of roadway, as well as those guard-rail sections which are apt to be covered with drifted snow.

Where no other protection exists, he plows ridges in the snow parallel to the road, in many instances effectively stopping drifting conditions which would otherwise offer difficulty. And last, he plows his snow when possible from the windward to the leeward side of the road surface, leaving clear shoulders behind and giving the wind opportunity to assist him in his further operations.

Open Roads All Winter

Readers of this article may be left in honest doubt as to whether it is presumed to deal principally with highway snow control problems or if, instead, it is an advertisement for Montana's winter roads. To such readers the writer wishes to say that their first guess was correct. However, the two subjects are necessarily tied up together. In common with the other states of the Rocky Mountain area, we keep our highways in safe and good passable shape during the winter months, even though rare blizzard conditions rock us back on our heels occasionally for a day or two at a time. Those, if any, who are skeptical of this statement are invited to visit Montana this winter.

Special Snow Plow For Power Graders

A special V-type snow plow with unusual lifting action and higher than the usual plows has been developed by Caterpillar Tractor Co., Peoria, Ill., specially for use on the No. 12 Auto Patrol. The face of the moldboard is painted with aluminum paint, giving a smoother surface for the snow to slide over and the top edge is made readily visible against a snowy background by a stripe of red paint. The plow is easily raised or lowered by a hydraulic power control in the cab and the rear end raises to the same height as the nose. The plow has replaceable runners made of cutting edge steel.

A mast-type wing for mounting at the cab is designed to push back the high banks of snow. It can be set at any angle or height on the mounting mast to meet varying conditions. It is 12 feet long, heavily based, and by power controls either end can be raised or lowered independently or both ends moved simultaneously.

The plow weighs 2,700 pounds, is 9 feet 6 inches wide at the cutting edges and 11 feet 6 inches wide at the top, and measures 4 feet 2 inches high at the front of the moldboard and 5 feet 8 inches high at the rear. It can be lifted a maximum of 12 inches above the ground. The snow wing weighs 1,650 pounds, is 12 feet long, and the blade is 30 inches high.

Combination Skull-Guard and Arc Welding Shield

A new piece of safety equipment, a combined Skullgard and welding shield, has just been announced by the Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh, Pa. The manufacturer states that the comfort and protection of a standard cap-type Skullgard is combined with the latest model one-piece welding shield which pivots to up or down positions. The Skullgard may be detached easily and quickly and worn separately for other work when desired.

Copies of a new bulletin No. CE-6, describing this new piece of equipment, may be secured direct from the manufacturer by mentioning this item or from this magazine.

Is your equipment obsolete? Read the announcements of new equipment in this issue and write for further information.

Salesmen and Distributors Wanted

for the fastest selling line of Road Machinery on the market. Good profits, no competition, internationally known. Write, giving past connections, financial setup, etc. Experience not necessary.

Address Box No. 215

Contractors and Engineers Monthly
470 Fourth Avenue, New York, N. Y.

HERE'S THE MOST PRACTICAL HIGHWAY MOWER THAT EVER CAME DOWN THE PIKE! . . .

SILVER KING

Years of experience and hundreds of owners prove without a doubt the Silver King Highway Mower does an outstanding job the year around. In addition to the annual Spring-to-Fall weed-mowing job, it is an ideal maintenance unit. It is also used for leaf removal in the Fall, snow removal in the Winter. Cities, counties and states all find the Silver King the first practical all-purpose mower. Without obligation, send for the Silver King Bulletin, "For Year 'Round Economy."

THE FATE-ROOT-HEATH CO.
Plymouth, Ohio

Send for this FREE FOLDER!

MORE YARDS- PER HORSEPOWER

FLAT DIGGING ANGLE MAKES IT EASIER TO FILL THE PAN TO CAPACITY

Flat angle digging and less crowding, combined with other brand new features, enable Baker Hydraulic Scrapers to get away to the dump with more pay loads per hour. It takes less power to load them.

They dump cleanly, spread evenly and leave a smooth even grade. Down pressure can be used to force the pan into tough soils. Baker Scrapers cut costs on many jobs. They can do it on yours.

BAKER HYDRAULIC SCRAPERS

Model 190, 2½ cubic yard—Model 210, 5 cubic yard

Always at the top, Baker Bulldozers and Gradebuilders, simply but powerfully built, with tremendous down pressure and smooth control, are the choice of earth movers for their important jobs. New models for many new uses.

BAKER BULLDOZERS
DIRECT LIFT-HYDRAULICS

BAKER TRACTOR EQUIPMENT
BULLDOZERS
GRADEBUILDERS
ROAD ROOTERS
TRACTOR SCRAPERS
ROAD DISCS
MAINTAINERS
SNOW PLOWS

Ask for Bulletins on Scrapers, Bulldozers and other Baker Tractor Equipment

THE BAKER MANUFACTURING COMPANY
585 Stanford Ave. Springfield, Ill.

Well-Planned Shop Aids County Work

(*Continued from page 26*)

cylinder compressor driven by a General Electric motor, and the circulating pump for the vacuum heating system delivering steam to the large unit heaters located in the garage section. One quarter of the garage is a machine shop where standard maintenance work is done and where an Alemite pressure lubrication unit is used to grease all trucks and other equipment.

The garage is located on a 22-acre lot which also contains a stone shed 70 x 27 feet with a slate roof which is used for miscellaneous storage. Another similar shed, 27 x 40 feet, is used as a blacksmith and carpenter shop and contains considerable miscellaneous equipment, including a Delta Mfg. Co. machine for boring square holes and mortising, a band saw, a buzz saw, a power drill press, blacksmith's forge and an acetylene generator made by the Sight Feed Generator Co. This unit is used to furnish the acetylene for repairs to machinery and bridges, and to furnish the gas for acetylene lights for emergency service. It is mounted on a light two-wheel truck for easy manipulation.

In the large level open area behind the garage is sufficient space for the open storage and the maneuvering of all county equipment. Three 500-watt electric floodlights mounted on the back of the garage illuminate this area during such times as the mounting of snow plows when a storm is due. The fleet of heavy snow plows is lined up at the back of the garage, a southern exposure, about Thanksgiving time, so that it is easy for the large trucks carrying the frames to run up to them and have the plows quickly attached. A number of hard-fought softball games have also been played in the area.

In order to insure accurate costs for each force account job of construction or maintenance, all county equipment is rented to each job. This procedure was started in the fall of 1937 and has proved very helpful in determining the accurate cost of all operations.

A system of reference markers has been established throughout the county highway system, so that in the future any feature of construction, maintenance, an accident, or the prospective location of a culvert can be noted in the field quickly by referring to the nearest markers. These markers are made of 4 by 4 timber, 4 feet long, painted red for the top 4 inches below the 1-inch four-way bevel and then are painted white to ground elevation. The section in the ground is creosoted to preserve the wood. These are placed at 500-foot intervals and bear the station number in white paint on the red section.

Equipment

The county construction and maintenance equipment used in Dutchess County includes eighteen FWD dump trucks with Wood hydraulic hoists. There are sixteen 5-ton units and two 3½-ton units, one of which is used as a water wagon. There are four Diamond T 1½-ton dump trucks with Wood hydraulic hoists and two Diamond T 1½-ton chassis carrying Ingersoll-Rand 120 compressors. The county owns one York pulled grader with a 10-foot blade, one Caterpillar No. 11 Auto Patrol and one Galion power grader, both with hydraulic scrapers. There are two 10-ton Galion rollers, two Centaur highway mowers, a Byers ¾-yard Model 80 gas shovel, two Koehring 2-bag mixers for bridge work, three Homelite pumps and one Homelite generator, and six Galion stone spreaders, two 9 feet wide and four 8 feet wide. The motor transportation section includes four Chevrolet and one Ford suburban wagons, which are used by field parties and one of which is for the use of the County Planning Commission. There are two Chevrolet coupes, one Pontiac coupe, and a Pontiac sedan for the County Superintendent of Highways.

Personnel

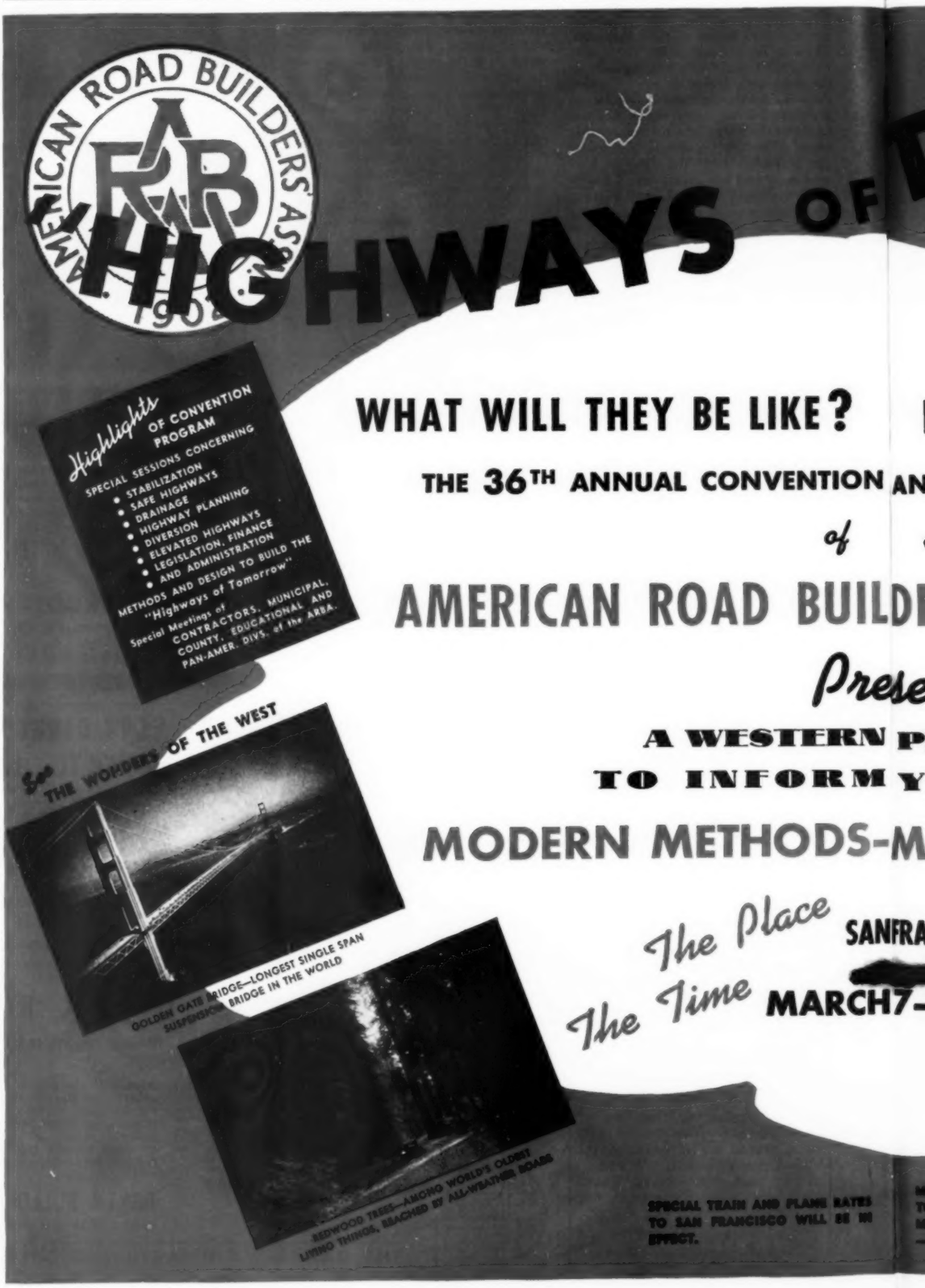
The administration of the County Highway Department of Dutchess County, New York, is under the direction of Robert Frost Knox, County Superintendent of Highways, assisted by C. H. O'Brien, in charge of the construction unit and R. R. Gage heading the maintenance unit. The bridge unit is in charge of A. E. Cooke, H. G. Becker and C. J. Yetzer are responsible for the garage and the maintenance of all equipment, and W. McI. Rand, the office forces.

Pennsylvania Builds Corrugated Highway

An experimental stretch of corrugated highway geared to automobile tire treads has been constructed on the Lakes-to-Sea Highway on U. S. 322 in Pennsylvania by the Pennsylvania Department of Highways. Corrugations, similar to the imprints of a heavy tire, were molded into the wet concrete on this 3,500-foot stretch by means of vacuum mats during construction.

On this section a new surface, 3 inches thick, was laid without reinforcement over the old concrete road which had deteriorated under the average daily traffic of 4,000 vehicles. The old surface was chipped down to the solid concrete, swept clean and washed. A cement paste, mixed to a consistency of thick cream, was then spread over the washed surface. Vacuum mats were then used to remove excess water and imprint the corrugations, diamond mesh in form.

The advantages anticipated from this new process include protection from skidding in all weather conditions, and the reduction of sun and wet glare. Tires passing over produce a humming sound but the corrugations are set closely together to prevent rough riding.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METHODS AND DESIGN TO BUILD THE "Highways of Tomorrow"
Special Meetings of CONTRACTORS, MUNICIPAL, COUNTY, EDUCATIONAL AND PAN-AMER. DIVS. of the ARBA.
See THE WONDERS OF THE WEST
GOLDEN GATE BRIDGE—LONGEST SINGLE SPAN SUSPENSION BRIDGE IN THE WORLD
REDWOOD TREES—AMONG WORLD'S OLDEST LIVING THINGS, REACHED BY ALL-WEATHER ROADS
SPECIAL TRAIN AND PLANE RATES TO SAN FRANCISCO WILL BE IN EFFECT.

New Truck Models Announced by White

Among the 1939 truck models which will be brought out by the White Motor Co., Cleveland, Ohio, in the heavy-duty field, are several models which feature engines of a completely new design. Basic improvements in manifolding, carburetion and valve cooling are claimed to result in more power per pound of engine weight and therefore greater payloads than was previously possible with engines of the same size.

With orders increasing every week since Labor Day and a return of the factory to a full five-day-week production schedule, indicating that the "log jam" in replacement truck buying has finally broken after a year of retarded buying, the White Motor Co. has announced an expanded program for 1939, including the introduction of the lowest priced truck in White history.

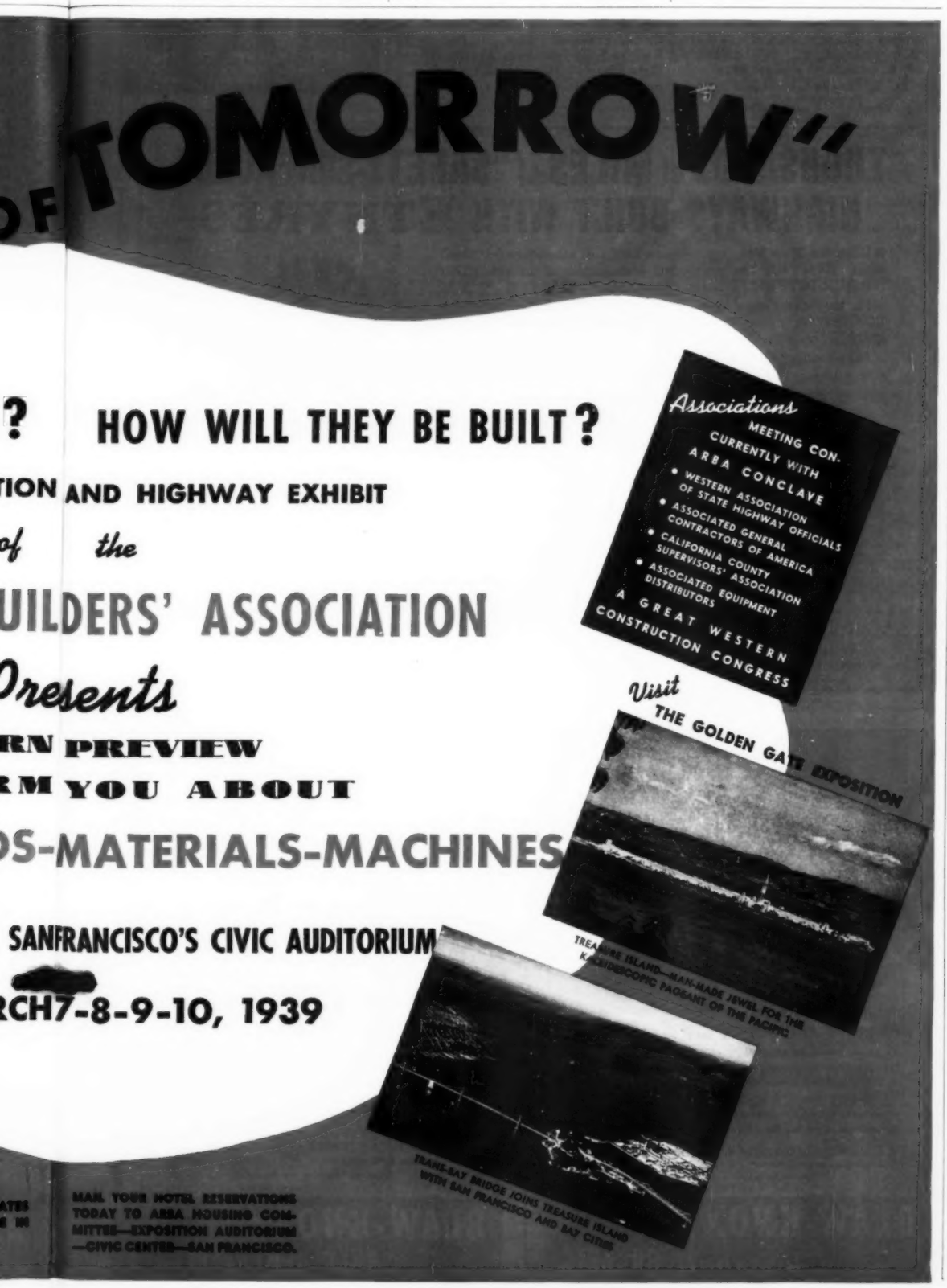
U.S. to Panama City Road Building Cost

It is estimated that $78,000,000 will be required to complete the Pan-American Highway from the United States to Panama City, according to the Pan-American Highway Finance Committee in its report to the Eighth International Conference of American States at Lima, Peru. These estimates are based on recent construction of sections of the highway now in successful operation.

New Shovel Bulletin

Bulletin X-50, just issued by the Harnischfeger Corp., 4419 W. National Ave., Milwaukee, Wis., describes the P & H Model 1055 3-cubic yard power shovel and 1055-LC 3-yard dragline. In addition to comprehensive information on the design, special features and operation of this machine, this bulletin illustrates many of the features of this shovel, including the P & H chain crowd, double-cut gears, large-diameter extra-wide drums, split-second power clutches, power dripper trip, and anti-friction bearings.

Copies of Bulletin X-50 may be secured by those interested direct from the manufacturer or from this magazine.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HOW WILL THEY BE BUILT?
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THE GOLDEN GATE EXPOSITION
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MAIL YOUR HOTEL RESERVATIONS TODAY TO ARBA HOUSING COMMITTEE—EXPOSITION AUDITORIUM —CIVIC CENTER—SAN FRANCISCO.

Concrete Road Laid With Unusual Speed

(*Continued from page 17*)

the form setters along the shoulder. Just before the silicate of soda was placed, the same crew poured the contraction joints and sealed the expansion joints with hand pouring pots, placing hot asphalt to within ½ inch of the surface of the slab.

The finishing touch on the shoulders was handled by an RD7 pulling a Caterpillar 66 grader. This was supplemented with a Continental 5-yard scraper used where necessary to bring up dirt to fill low spots along the shoulders.

Lubrication and Maintenance

The contractor maintained a truck mechanic at the yard close to the batching plant where he could keep a close watch over each truck as it passed, and there he had quite complete equipment for making minor repairs and adjustments to the trucks and the dumping mechanisms.

The drivers were required to grease the trucks every night because of the extremely dusty condition of the subgrade over which they had to operate. Each night the night watchman changed the oil in the oil bath air cleaner to protect the crankcase oil and the cylinders. In addition, each truck was equipped with an A-C oil filter to remove any impurities that did get into the oil through the breather. The contractor standardizes on the lubricants on each job, making a contract with a local distributor for some standard brand. On this work at Lafayette to Maurice, Shell lubricants were used throughout.

Major Quantities

The major quantities for this contract were:

Item	Quantity	Unit Price
Roadway excavation	109,487 cu. yds.	$ 0.21
Borrow	10,480 cu. yds.	0.21
Overhaul	83,388 sta. yds.	0.005
Portland cement concrete, Type E	106,443 sq. yds.	1.76
Reinforced concrete pipe, 24-inch	231 ft.	3.25
Corrugated iron pipe, 18-inch	1,138 ft.	2.35
Corrugated iron pipe, 24-inch	766 ft.	3.35
Class AA concrete, approach slab and deck for bridges	424 cu. yds.	22.00
Class A concrete	802 cu. yds.	20.00
Deformed reinforcing steel	173,704 lbs.	0.045
Fabricated structural steel	116,810 lbs.	0.059
Creosoted timber	5,048 MFBM	115.00
Creosoted timber piles	3,590 ft.	0.90
Mud pump connections, on all approach slabs	400 nipples	0.50
Asphalt mineral filler, joints	8,853 tons	75.00
Fabric reinforcement	421,516 lbs.	0.045
Metal center strip	52,983 ft.	0.095
Dowel assembly	31,775 ft.	0.12
Fiber expansion joints, ½-inch	5,216 sq. ft.	0.205

Personnel

This Bond Issue Road, Project No. 3703, was built for the Louisiana Highway Commission by Barber Bros. Contracting Co., Inc., of Baton Rouge, La., with W. G. Butler as Superintendent. For the Highway Commission, C. M. Butterfield was Resident Engineer.

By-Ways to Highways

"Change By-Ways to Highways" is the title of a new 32-page illustrated booklet recently issued by the Allis-Chalmers Mfg. Co., Tractor Division, Milwaukee, Wis., to describe its line of Speed Patrols and the part they have played and can play in changing mud lanes and cart paths into good roads contributing to the prosperity and cultural improvement of the community.

In addition to describing and illustrating the Speed Patrols themselves, the booklet discusses and depicts the many uses of Speed Patrols in the construction and maintenance of highways. Copies of this booklet, which is of interest to all contractors and state and county highway engineers, may be secured direct from the manufacturer.

Traffic Lines Cast in Color

Froemming-Kies, Inc., Use Novel Machine for Placing Yellow and Black Stripes On Galveston Highway

(*Photo on page 36*)

✦ THE paving of the Galveston Island approach to the new causeway connecting the island and city of Galveston with the mainland and carrying the heavily-traveled highway to Houston was recently completed by Froemming-Kies, Inc., of Austin, Texas. The feature of the job was the novel manner in which the contractor laid a traffic stripe composed of a 6-inch yellow stripe between two 6-inch black stripes, incorporating the coloring material in the concrete pavement.

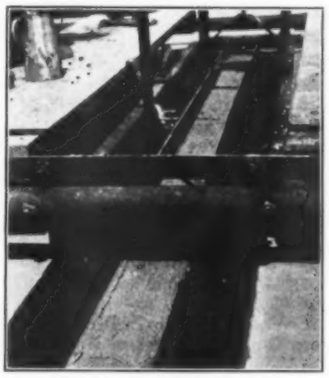
The Traffic Stripes

The traffic stripe was formed by working magnetic oxide in yellow and black into the finished concrete to a depth of ¼ inch and hand floating to refinish the stripe. In order to provide a smooth line for all edges, the contractor developed a hand-propelled machine with an 18-inch hand-wheel and a chain drive to the rear axle. All four wheels of this machine were flanged to keep it in perfect line on the steel road forms. A three-compartment trough 7 feet long was built in the center of the machine and parallel to the pavement edge. These compartments, composed of structural steel and sheet metal, could be raised by means of a ratchet to permit the operator to move the machine forward, and likewise lowered to the pavement to permit the spreading of the coloring materials and floating them into the surface. The yellow was placed in the center compartment which is directly over the exact center of the pavement, and the black was placed in each of the side compartments. The excellence of the line secured at the edges of the stripes is well shown in the accompanying illustration. The working of the color into the surface was done by hand floating, which also refinished this 18-inch strip of pavement. The result of this operation is an attractive and straight stripe and the two-color scheme is expected to be invaluable in guiding the heavy traffic safely over this important thoroughfare.

The Paving

The paving on this project consisted of two 22-foot 6-inch traffic lanes with an esplanade section in the center and a 6-inch integral curb on the inside edge of each lane. In addition to the regular traffic lanes there was one transition which widened from 44 to 46 feet in 278 feet, and there were two larger intersections. The contractor used a Koehring 27-E paver for mixing the concrete, followed by a Panama Type finishing machine, a Flex-Plane combination longitudinal joint installing machine with a rescreeding attachment, and then the contractor's own device for installing the center stripes. The adaptability of the Panama Type finishing machine to the various widths was of great assistance to the contractor and reduced his finishing problems. The finishing machine carried a cutter to make the preliminary longitudinal groove for the ribbon joint material installed by the Flex-Plane. Behind this the usual longitudinal floating and belting was done by hand.

The cement factor of the concrete used was four bags per cubic yard, which made a total of 4.8 sacks of cement per 32.4-cubic foot batch. The approximate bin weights for aggregates were 2,600 pounds of gravel and 1,600 pounds of sand, weighed out in a Blaw-Knox batching plant. It was necessary to use 30 pounds of mineral filler with this batch to eliminate bleeding. A workability factor of 82 was used with a maximum of 8.25 gallons of water per sack of cement.



The Line-Installing Machine

As the subgrade of the new causeway had been constructed by the hydraulic method with sand pumped from the Gulf, the hauling problem for the batch trucks was a difficult one. Because of the fine and unbinding character of this Gulf sand it was necessary to use single-batch trucks with dual pneumatic rear tires in addition to keeping a constant stream of water playing upon the sand to bind it and permit the single-batch trucks to negotiate the shoulder.

Personnel

Sixty working days were allowed for the completion of this project and the work was actually completed by Froemming-Kies, Inc., of Austin, Texas, in thirty-five working days with George H. Kies as Superintendent. For the Texas State Highway Department L. A. Peterman was Project Engineer.

New Caterpillar Vice Pres.

W. O. Bates, Jr., recently transferred from the Caterpillar Tractor Co.'s San Leandro, Calif., office to head the Patent Department at Peoria, has been appointed a Vice President of the company. Mr. Bates is a son of the founder of the Bates Machine & Tractor Co., manufacturer of the Bates Steel Mule.

STOP WINTER DELAYS
Get Summer Efficiency with Aeroil
Concrete Heaters
Water Heaters
Salamanders
Thawing Torches
- ALSO -
. . . Kettles for Tar, Pitch and Asphalt . . .
Emulsion Distributors . . . Power Sprays . . . Weed Burners
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Send for FREE Bulletin No. 101C
AEROIL BURNER CO., Inc.
WEST NEW YORK, NEW JERSEY
Chicago, Ill. San Francisco, Cal. Dallas, Tex.

THOUSANDS of MILES of "SAFETY-SURFACED" HIGHWAYS BUILT WITH ETNYRES

● With the New Year comes more new and attractive features which ETNYRE has developed and combined in the 1939 "BLACKTOPPER" Distributor models.

Shown below is an illustration of an ETNYRE "BLACKTOPPER" applying ¼ gal. per sq. yd. finishing coat with 18 ft. spray bar on a Texas highway near Seymour, Texas.

Maximum daily output with no delays has earned the enviable position the ETNYRE "BLACKTOPPER" enjoys with contractors and highway officials thruout the world.

● Photo above illustrates an ETNYRE "BLACKTOPPER" distributor laying the base course on highway No. 277 south of Lawton, Oklahoma.

Application of 1.8 gal. per sq. yd. of 85-100 penetration asphalt heated to 325° F. was made with 24 ft. full width spray bar. Even greater widths of bars are available with an ETNYRE.

Note the uniformity with which the material is applied . . . typical example of the thousands of miles of "SAFETY-SURFACED" Bituminous highways being constructed annually with ETNYRES.

Manufactured by

E. D. ETNYRE & COMPANY

Reliable dealers thruout United States

Factory and Main Offices OREGON, ILLINOIS

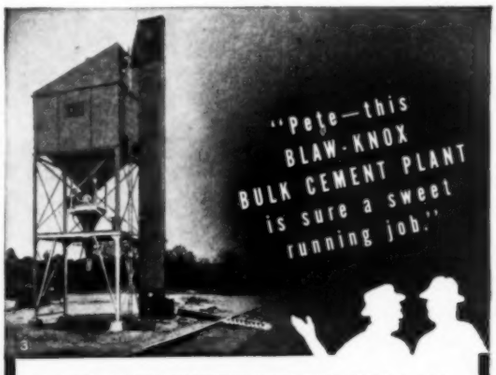
Factory Branch 173 Bent Street, East Cambridge, Mass.

● Contractors know that the proper use of modern steels and alloys at critical points is their assurance of long uninterrupted service when they buy a Blaw-Knox Bucket.

If you aim to increase yardage and efficiency, to reduce maintenance costs and prolong the life of your buckets—investigate Blaw-Knox Buckets for all kinds of digging and rehandling. Send for Blaw-Knox Bulletin No. 1561.

BLAW-KNOX DIVISION of Blaw-Knox Company
FARMER'S BANK BUILDING PITTSBURGH, PENNA.
Offices and Representatives in Principal Cities

BLAW-KNOX *Clamshell* BUCKETS



● Blaw-Knox BULK CEMENT PLANTS are the ultimate in portability, speed, and convenience of use and operation. They are *complete units* for unloading, storage, batching and handling of bulk cement—dependable and accurate.

Completely described in Blaw-Knox Catalog No. 1566. Send for a copy

BLAW-KNOX DIVISION of Blaw-Knox Company
FARMER'S BANK BUILDING PITTSBURGH, PENNA.
Offices and Representatives in Principal Cities

BLAW-KNOX BULK CEMENT PLANTS

DIRECTORY OF EQUIPMENT DISTRIBUTORS

The following cards (arranged by states) show the names of dealers in contractors' equipment and supplies, with a record of various lines handled.

ARIZONA TRACTOR & EQUIP. CO.

1402 North 19th Ave., P. O. Box 1494, Phone 3-1146, Phoenix, Ariz.

Representing

ATECO Dirtmovers, Bulldozers, Tamping Rollers, Scarifiers
BROOKVILLE Locomotives
BROS Bulldozers, Angledozers, Snow Plows
BUCYRUS-ERIE Shovels
BUFFALO-SPRINGFIELD Rollers
CLETRAC Tractors
CLEVELAND Rock Drills
EAGLE Crushers
EMSCO Road Equipment
GAR WOOD (Isaacson) Bulldozers, &c.
GORMAN-RUPP Pumps
KEWANEE Conveyors
LITTLEFORD Asphalt Equipment
SCHRAMM Compressors
SMITH Mixers
WHITE & INDIANA Trucks

Member: Associated Equipment Distributors

F. RONSTADT HARDWARE COMPANY

"Pioneers in Good Merchandising"

TUCSON ARIZONA

DAVENPORT Rippers & Dirt Moving Equipment
ELLION Graders and Rollers
McCORMICK-DEERING Industrial and Crawler Tractors
McCORMICK-DEERING Diesel and Gas Power Units
STERLING Hoists
STERLING Portable Pumps
P & H Shovels & Elec. Welders
POMONA Turbine Pumps
MYERS Pumps
KIMBALL-KROGH Centrifugal Pumps
TOLEDO Road Torches
WOOD Hand Shovels

GARLINGHOUSE BROS.

2416 E. 16th St. Los Angeles, Calif.

Southern California Distributors for

RANSOME—Concrete Mixers, Pavers, Pneu. Placers, Grouters, Concrete Placing Equipment
WORTHINGTON—Portable Compressor, Pneumatic Tools, Jackhammers, Pumps, etc.
BROWNING—Truck Cranes, Shovels, Locomotive Cranes
OWEN—Clamshell Buckets
OMANA—Dragline Buckets
WHITCOMB—Gasoline, Diesel, Electric Locomotives
A. LESCHEN & SONS—Wire Rope
McKIERNAN-TERRY CORP.—Pile Hammers
LAMBERT-NATIONAL—Hoists and Cableways
DIAMOND IRON WORKS—Crushers, Portable Gravel Pl.
RAMSEY—Hand and Power Winches
NOVO—Engines, Pumps, etc.
UNIVERSAL—Panel Forms, Form Clamps, etc.
Manufacturers of Gar-bro Concrete Carts, Wheelbarrows, Concrete Hoppers, Buckets, etc.

EDWARD R. BACON CO., INC.

Folsom at 17th St. San Francisco

Aeroil Emulsion Distrs.
Allis-Chalmers Tractors
American Concrete Grinders
Byers Shovels, Cranes
Carlson Bit Grinders
Cedar Rapids Crushers
Cleveland Rock Drills
Cleveland Trenchers
Dobbie Derricks, Fittings
Erie Rollers
Hercules Chip Spreaders
Hercules Power Units
Hough Universal Sweepers
Huber Rollers
Interstate Tramways
Jackson Concrete Vibrators
Jaeger Mixers, Pumps, Hoists, Paving Equip.
Johnson Bins, Batchers
Jones Saw Benches
Littleford Wheeled Rollers
M-B Street Markers
McKiernan-Terry Pile Hammers
Marion Shovels, Cranes, Draglines
Nelson Bucket Loaders
Ohio Locomotive Cranes
Page Dragline Buckets
Porta Conveyors
Ramsey Winches
Schramm Air Compressors
Symons Cone Crushers, Vibrating Screens
Toledo Torches
Walter Motor Trucks
Wiard Plows
Winslow Scales

Member: Associated Equipment Distributors

NORRIS K. DAVIS, INC.

400 Seventh St. San Francisco, Calif.

Representing

LE ROI CO.—Gasoline Power Units and Parts
MINN. STL. & MACHY. CO.—Twin City Engines, parts
HANSON CLUTCH & MACHY. CO.—Full Revolving Shovels, Cranes, Draglines, ¾, ½, ⅝, and ¾-yd.
KEYSTONE DRILLER COMPANY—Excavating Machines, Shovels, Cranes, Draglines, Pull-Scoops, Skimmers, Plunger Shovels, Pavement Breakers
DAVIS COMPANY—Large Tilting Mixers, 1, 2, 3, and 4-yd., Weigh Batchers, Batching Plants, Manual or Full Automatic Operation, Readymix Concrete Plants and Equipment, Motor Truck Concrete Mixers and Carriers, Electrically Operated and Controlled Water Meters, Steel Silos, Bins, Bunkers, Hoppers, Bunker Gates, Chutes
O. K. CLUTCH & MACHY. CO.—Hoists & Compressors
CONSTRUCTION MACHY. CO.—Wonder Mixers, Hoists

GARFIELD & CO.

Hearst Building San Francisco

Representing

LINK-BELT Shovels, Cranes, Draglines
BAY CITY Shovels, Cranes, Draglines
PLYMOUTH Gas and Diesel Locomotives
INDUSTRIAL BROWN HOIST Cranes
WORTHINGTON Compressors, Drills, Pumps
ATLAS Battery, Locomotives
AUSTIN Trenching Machines
PACIFIC Steel Crushers
LEACH Concrete Mixers
ROGERS BROS. Trailers

LLEWELLYN MACH. CORP.

1030 N. Miami Ave., Miami, Florida

Amer. Car & Foundry Co.
Amer. Saw Mill Machy. Co.
Ames Baldwin Wyoming Co.
Anchor Coner. Machy. Co.
Atlas Imp. Diesel Eng. Co.
Barber-Greene Co.
Blystone Mfg. Co.
Climax Engrg. Co.
Century Electric Co.
Coffing Hoist Co.
Coldwell Lawn Mower Co.
Congress Tool & Die Co.
Henry Disston & Sons, Inc.
Elkhart Rubber Works
Forest City Bit & Tool Co.
Gallmeyer & Livingston Co.
L. H. Gilmer Co.
Goulds Pumps, Inc.
Hercules Motor Corp.
Hewitt Rubber Corp.
Independent Pneu. Tool Co.
Ingersoll-Rand Co.
Jaeger Machine Co.
Edw. E. Johnson, Inc.
LaRoi Co.
Link-Belt Co.
F. E. Myers & Bros. Co.
Novo Engine Co.
Northwest Engrg. Co.
Ohio Pattern Wks. & Fdy Co.
Ohio Valley Pulley Wks.
Page Engrg. Co.
Porter Cable Mach. Co.
Roberts Filter Mfg. Co.
Serve-I, Inc.
Stover Mfg. & Engine Co.
Syntron Co.
Viking Pump Co.
Wall Rope Works, Inc.
Westinghouse Elec. Supply Co.
Whitehead Bros. Rubber Co.
Wickwire Spencer Steel Corp.
Yates-American Machine Co.

Member: Associated Equipment Distributors

R. S. ARMSTRONG & BRO. CO.

676 Marietta St. Atlanta, Ga.

Representing

BEEBE Hand Hoists
BUCYRUS-ERIE Cranes, Shovels
BUTLER Bins, Batchers
CARBIC Lights
CHICAGO PNEUMATIC Air Compressors
DOMESTIC Pumps, Hoists
GENERAL ELECTRIC Motors
HYPRESSURE JENNY Vapor Cleaning Machine
JAEGER Concrete Mixers, Pumps, Paving Machy.
JONES-SUPERIOR Saw Rigs
LAKEWOOD Road Machinery, Handling Equipment
LE ROI Engines
LIDGERWOOD Hoists
OWEN Buckets
SASGEN Derricks and Winches
CRUSCA Drill Steel
TRAYLOR Rock Crushers
WATERLOO Bar Benders
WORTHINGTON Pumps

Member: Associated Equipment Distributors

TRACTOR & MACHINERY CO., INC.

351 Whitehall St., S.W., Atlanta, Ga.

Representing

NORTHWEST Cranes, Shovels and Draglines
NOVO Engines, Pumps and Hoists
CHAMPION Rock Crushers
ERIE Aggremeter Plants
RANSOME Concrete Mixers
WORTHINGTON Air Compressors

Member: Associated Equipment Distributors

YANCEY BROTHERS, INC.

634 Whitehall St., SW Atlanta, Ga.

"CATERPILLAR" Tractors, Graders, Power Units, etc.
REX Pavers, Pumps, etc.
BARBER-GREENE Ditchers, Conveyors, Loaders
CEDAR RAPIDS Crushers
KINNEY Distrs., Pumps
CONNERY Kettles, Tools
CLYDE Hoist & Erect. Eq.
RAMSEY Winches & Hoists
BUFFALO-SPRINGFIELD Rollers
KILLEFER Rippers, Drag Scrapers, Plows, Harrows
LAPLANT-CHOATE Crawler Dump Wagons, Bulldozer Tampers
WIARD Road Plows
RUSSELL Road Plows
INGERSOLL-RAND Air Compressors, Pneu. Tools
THEW-LORAIN Shovels
TIMKEN Drill Bits & Steel
LETOURNEAU Carry-all Scrapers, Angledozers, Rippers
PACIFIC Pumps
COUNCIL Tools
HESTER & ATHENS Plows
INDIAN Fire Pumps
BARNES Diaphragm Pumps
AMERICAN Manganese Dies
AMERICAN Wire Rope
D-A Lubricant & RPM Oil
DAVEY Compressors
PAGE Dragline Buckets
LAMBERT Automatic Quarry Skips, Hoists, etc.
RED STAR Shovels
VERONA Mattox, Tools
JOHNSON Bins, Batchers, Wheelbarrow Scales, Bulk Cement Plants
METAFORM Road, Sidewalk, Curb & Gutter Forms

Member: Associated Equipment Distributors

F. H. BURLEW COMPANY

221-25 W. Huron St., Chicago, Ill.
Telephone SUPerior 5804

AMERICAN HOIST Crawler Cranes, Shovels, Draglines, Bulldozers, Snow Plows
BATES Wire Ties, etc.
BEEBE BROS. Hoists
CHAIN BELT Mixers, Pavers, Pumps, Saw Rigs, Conveyors, Elevators, Pumpcrete, Moto Mixers
ERIE Steel Bins, Batchers, Aggremeter Plants
INSLEY Coner. Towers, Chuting, Cranes, Shovels, Choker Hooks, Carts
M & M Form Clamps
MEYER-HECHT Adjustable Shores
NORDBERG Track Shifters and Tunnel Shovels
SASGEN Derricks
SCHRAMM Air Compressors, Tools
WELLMAN ENGR. CO. "Williams" Clam Shell and Dragline Buckets, Trailers
WINSLOW Whlb. Scales
WYOMING Red Edge Picks, Scoops and Shovels

McKiernan-Terry Corp. (Divisions)
McKIERNAN-TERRY—Pile Hammers, Extractors
LAMBERT-NATIONAL—Hoists, Cableways
PETTIBONE & CONDICT—Special Machinery

Wheelbarrows, Hose, Cable Rope, Tarpaulins, etc., carried in stock

Member: Associated Equipment Distributors

O. T. CHRISTERSON CO.

3900 So. Wabash Ave. Chicago, Ill.

Representing

KOEHRING—Mixers, Pavers, Cranes, Shovels, Dumpers, Mud Jacks
KWIK-MIX—Concrete and Bituminous Mixers
BLAW-KNOX—Road Forms, Bins, Batchers, Finishing Machines, Buckets
GORMAN-RUPP—Self Priming Centrifugal Pumps, Road Pumps
LITTLEFORD—Distributors, Tar Kettles, Heaters, Torches
PARSONS—Trench Machines, Backfillers, Turbo Mixers
C. H. & E.—Road Pumps, Saw Rigs, 2-Ton Rollers
R. B.—Power Subgraders, Trailgraders
CHICAGO PNEUMATIC TOOL CO.—Compressors, Air Tools, Hose
CLEVELAND—Subgraders, Straight Edges, Finishing Tools

Concrete Carts, Wheelbarrows, Supplies

PEORIA TRACTOR & EQUIPMENT CO.

400 Franklin Street Peoria, Illinois

Representing

Athey Truss Wheel Co.
Caterpillar Tractor Co.
Killefer Mfg. Corp.
LaPlant-Choate Mfg. Co.
R. G. LeTourneau, Inc.
Willamette-Hyster Co.
Universal Crusher Company

Telephone 6177

INDIANA EQUIP. CO., INC.

327-329 West Market St., Indianapolis, Ind.

Representing

ATHEY TRUSS—Wagons, Bulldozers
BUFFALO-SPRINGFIELD—Rollers
"CATERPILLAR"—Road Machinery
"CATERPILLAR"—Tractors
GARDNER-DENVER—Compressors, Tools
LaPLANT-CHOATE—Wagons, Scrapers, Bulldozers
LE TOURNEAU—Scrapers, Buggies, Bulldozers
OWEN—Clam Shell Buckets
PAGE—Dragline Buckets
SAUERMAN—Cableways, Power Scrapers
UNIVERSAL—Crushers, Pulverizers
THEW—Shovels, Draglines
TYLER - NIAGARA—Vibrating Screens

Member: Associated Equipment Distrjbutors

GIERKE-ROBINSON CO.

4th & Ripley Sts. Davenport, Iowa

Representing

BLAW-KNOX—Steel Road, Curb and Gutter Forms, Bins, Batchers, Clamshell Buckets, Truck Turntables, Ord Concrete Road Finishers
CHAIN BELT—Mixers, Pavers, Pumps, Saw Rigs, Conveyors, Elevators
CLYDE—Gasoline and Steam Hoists, Derricks
HOUGH-UNIVERSAL—Sweepers
MASTER—Vibrators, Generators, Arc Welders
SULLIVAN—Air Compressors, Tools
TRACKSON—Crawlers, Shovels and Bulldozers
THEW-LORAIN—Cranes, Shovels, Draglines
TIMKEN—Detachable Rock Bits, Steels
UNIVERSAL—Truck Cranes
UNIVERSAL—Form Clamps

Member: Associated Equipment Distributors

THOMAS L. BARRET

Contractors Equipment and Supplies

712 West Main St., Louisville, Kentucky

C. H. & E. Road Pumps, Hoists, etc.
RUSSELL Scrapers, Drags, Plows
RANSOME Concrete Equipment
BAY CITY Shovels and Cranes
BARRET Asphalt Expansion Joint
MASTER Concrete Vibrators
PIONEER Crack and Joint Filler
HAISS Loaders and Conveyors

Reinforcing Steel, etc.

HENRY A. PETTER SUPPLY COMPANY

Paducah Kentucky

Alemite Equipment
American Wire Rope, Moth Balls
Bates Bar Ties
Beebe Hand Hoist
Black & Decker Tools
Cedar Rapids Crushers
Chain Belt (Rex) Mixers
D-A Lubricants
DuPont Explosives
Dobbie Derricks
Elastite Expansion Joint
Euclid Scrapers
Fairbanks Scales
Farquhar Engines, Boilers
Gardner-Denver Tools
General Electric Motors
Gulf States Reinforcing Steel
Hanson Excavators
Hauck Heaters and Thawers
Johnson Bins and Hoppers
LaRoi Gas Engines
Lidgerwood Hoisting Machy.
Link-Belt Cranes, Shovels
Littleford Equipment
Novo Pumps and Hoists
Oxweld Apparatus
Page Buckets
Portable Conveyors
Rogers Bros. Trailers
Sasgen Derricks
Sauerman Scrapers
Shunk Grader Blades
Toledo Torches
Universal Concr. Accessories
Vulcan Pile Equipment
Wehr Graders
Western Road Machinery
Worthington Pumps
Wyoming Shovels

FLETCHER EQUIP. CO., INC.

309 Magazine Street New Orleans, La.

American Mfg. Co.
Bethlehem Steel Co.
Bates Valve Bag Corp.
Clyde Iron Works, Inc.
Diamond Iron Works
The Gorman-Rupp Co.
Insley Mfg. Co.
The Jaeger Machine Co.
Jones Superior Machine Co.
C. S. Johnson Co.
Koehring Co.
Kwik-Mix Mixer Co.
Littleford Bros.
M & M Wire Clamp Co.
Mail Tool Co.
Owen Bucket Co.
Parsons Co.
Page Engineering Co.
Portable Machinery Co.
Jos. G. Pollard Co.
Sasgen Derrick Co.
Sauerman Bros., Inc.
Sterling Wheelbarrow Co.
Skilsaw, Inc.
Toledo Pressed Steel Co.
Templeton, Kenly & Co., Inc.
Universal Form Clamp Co.
Wood Shovel & Tool Co.

Member: Associated Equipment Distributors

ALBAN TRACTOR CO., INC.

725-27 East 25th St. Baltimore, Md.

Representing

CATERPILLAR TRACTORS AND ROAD MACHINERY

LINK-BELT CO.
GENERAL EXCAVATOR CO.
KILLEFER MFG. CORP.
LAPLANT-CHOATE MFG. CO.
R. G. LETOURNEAU, INC.
GARDNER-DENVER CO.
"INVADER" SHOVELS
WILLAMETTE-HYSTER CO.
ATHEY TRUSS WHEEL CO.
BLAW-KNOX CO.
HERCULES ROLLER CO.
ROGERS BROS. CO.
WM. BROS BOILER MFG. CO.
BUCKEYE TRACTION DITCHER CO.
PIONEER GRAVEL EQ. MFG. CO.

CATERPILLAR DIESEL AND GAS POWER UNITS

Member: Associated Equipment Distributors

D. C. ELPHINSTONE, INC.

115 S. Calvert St. Baltimore, Md.
976 Nat'l Press Bldg., Washington, D. C.

Representing

Koehring Co.
Kwik-Mix Co.
Insley Mfg. Co.
Parsons Co.
Geo. Haiss Mfg. Co.
Sauerman Bros. Inc.
Allis-Chalmers Mfg. Co.
Worthington Pump & Machy. Corp.
Linn Mfg. Corp.
Owen Bucket Co.
LaBour Co., Inc.
Emerson Pump & Valve Co.
Iowa Mfg. Co.
Erie Steel Constr. Co.
H. K. Porter Co.
Reed-Prentice Corp.
Truscon Steel Co.
McKiernan-Terry Corp.
Lambert-National Hoists
Goodall Rubber Co.
Minwax Co.
E. D. Etnyre & Co.
Hough-Universal Sweepers
Griffin Wellpoint Corp.
Huber Mfg. Co.
Electric Tamper & EquipCo.
Gorman-Rupp Company
Euclid Road Machinery Co.
Cleaver-Brooks Co.
Hauck Mfg. Co.

Member: Associated Equipment Distributors

JOHN C. LOUIS COMPANY

511 W. Pratt St. Baltimore, Md.

Representing

JAEGER—Concrete Mixers, Pumps, Truck Mixers, etc.
LAKEWOOD—Finishers, Forms, Towers
AMERICAN CABLE—Truc-Lay Wire Rope
BUTLER—Bins
CENTAUR—Road Mowers
ADAMS—Leaning-Wheel Graders
ALABAMA—Cast Iron Pipe
WHEELING—Corrugated Culvert Pipe
GOOD ROADS—Crushers
LITTLEFORD—Asphalt Heater, Distributors
JONES—Saw Rigs
GENERAL—Wheelbarrows
TIMKEN—Detachable Rock Bits

Member: Associated Equipment Distributors

THE HENRY H. MEYER CO.

110 S. Howard St., Baltimore, Md.
628 Munsey Building, Washington, D.C.

Representing

Barber-Greene Co.
Blaw-Knox Co.
Boston & Lockport Bl. Co.
Byers Machine Co.
Phillip Carey Co.
Columbus Conveyor Co.
Connery & Co., Inc.
Dobbie Fdry. & Mach. Co.
Domestic Eng. & Pump Co.
Duff-Norton Mfg. Co.
Harrington Co.
Ingersoll-Rand Co.
A. Leschen & Sons Rope Co.
Lidgerwood Mfg. Co.
Lima Locomotive Works
Master Vibrator Co.
Novo Engine Co.
Pierce Equip. Co.
Pulsometer Steam Pump Co.
Ransome Concrete Machy. Co.
Richmond Screw Anchor Co.
Sterling Wheelbarrow Co.
Templeton, Kenly & Co.
Union Iron Works
Universal Road Machy. Co.

Member: Associated Equipment Distributors

CLARK-WILCOX COMPANY

790-798 Albany St. Boston, Mass.

Representing

RANSOME—Concrete Mixers, Chuting Equip.
NORTHWEST—Cranes, Shovels, Draglines
BLAW-KNOX—Steel Forms, Bins, Buckets, Finishers
PIONEER—Crushers, Gravel Plants
CARTER—"Humdinger" Pumps
INGERSOLL-RAND—Air Compressors
ORR-SEMBOWER—Hoists, Rollers, Mixers
HAUCK—Oil Burners and Heaters
HAISS—Elevators, Conveyors and Loaders
ALLIS-CHALMERS—Tractors
BAKER—Bulldozers
BEEBE BROS.—Hoists
CLEVELAND—Formgraders
C. R. JAHN CO.—Trailers
BURCH—Ross Plows, Road Machinery
HOMESTEAD—Hypressure Jenny Cleaner
PIERCE—Rollers MASTER—Vibrators
COMPLETE—Wellpoints
BLYSTONE—Mortar Mixers
HAZARD—Wire Rope, Cable
ATLAS—Powder, Blasting Equipment

Member: Associated Equipment Distributors

THE EQUIPMENT CO.

30 Prentiss St. Boston, Mass.

Representing

Link-Belt Cranes and Shovels
Ingersoll-Rand Compressors and Tools
"Williams" Buckets and Trailers
Homelite Pumps and Generators
Hanson Excavators and Trailers

COMPLETE RENTAL SERVICE

Member: Associated Equipment Distributors

HEDGE & MATTHEIS CO.

285 DORCHESTER AVE. BOSTON, MASS.

Boston, Springfield, Worcester, Mass.; Portland, Bangor, Me.; Hartford, New Haven, Conn.; Concord, N. H.; Bellows Falls, Vt.; Providence, R. I.

J. D. Adams Co.
Aeroil Burner Co.
Amer. Tubular Elevator Co.
Byers Machine Co.
Chicago Automatic Conveyer Co.
Electric Tamper & Eq. Co.
Erie Steel Constr. Co.
Four-Wheel Drive Sales Co.
Frink, Carl H.
Huber Mfg. Co.
Ingersoll-Rand Co.
Jaeger Machine Co.
Jones Superior Machine Co.
Lakewood Engrg. Co.
A. Leschen & Sons Rope Co.
Lima Locomotive Wks., Inc. Shovel & Crane Division
Linn Manufacturing Corp.
McKiernan-Terry Corp. and Lambert-Nat'l Hoist Div.
Owen Bucket Co.
Page Engineering Co.
Parsons Co.
Red Star Products Co.
Rogers Bros. Corp.
Sasgen Derrick Co.
Sauerman Bros. Inc.
Syntron Co.
Toledo Pressed Steel Co.
Universal Form Clamp Co.
Wood Shovel & Tool Co.

Member: Associated Equipment Distributors

ABRAMS-ANDERSON CO.

Construction Equipment

10425 Northlawn Ave., Detroit, Mich.

Representing

Aeroil Burner Co.
Archer Iron Works
Brookville Locomotive Co.
Butler Bin Company
Bucyrus-Erie Co.
C. H. & E. Mfg. Co.
Hazard Wire Rope Company
Independent Pneumatic Tool Co.
LeRoi-Rix Compressors
Sasgen Derrick Company
T. L. Smith Company
Smith Engineering Works
Sterling Wheelbarrow Co.
Toledo Pressed Steel Co.

Member: Associated Equipment Distributors

WE WOULD LIKE TO HAVE YOU HELP US

keep this Directory of Dealers in construction equipment up to date. Therefore, we would greatly appreciate any suggestions or corrections that you may have to offer.

CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Avenue, New York

CONTRACTORS MACHY. CO.

530 Monroe Ave., N.W. Grand Rapids, Mich.

Northwest Engineering Co.
Sullivan Machinery Co.
Pioneer Gravel Equipment Mfg. Co.
Clyde Sales Company
Page Engineering Co.
American Steel & Wire Co.
Burch Corporation
Ross Snow Plows
Sasgen Derrick Company
Sauerman Brothers
Syntron Company
LeRoi Company
Aeroil Burner Company
Connery & Company
Moritz-Bennett Company
Ames Shovels
Rowe Manufacturing Co.
Toledo Pressed Steel Co.
Bates Wire Ties
Trackson Co.
Rex Mixers and Pumps
Barco Gas Hammers
Blaw-Knox Company
Dietz Lanterns
Black & Decker Tools
Atlas Conveyors
Master Vibrators
Lansing Company

Member: Associated Equipment Distributors

LANGE TRACTOR & EQ. CO.

304 Lake Ave., S. Duluth, Minn.

Cleveland Rock Drills
Adams Road Machinery and Power Shovels
Ateco Scrapers and Bulldozers
Leach Concrete Mixers
Lenhart Wagons
Gohi Culverts
Hanson Trailers
Wausau Snow Plows
Oshkosh 4-Whl. Drive Trucks
MacWhyte Wire Rope
Speeder Power Shovels

Member: Associated Equipment Distributors

THORMAN W. ROSHOLT CO.

3138 Snelling Ave. Minneapolis, Minn.

Representing

IOWA "Cedar Rapids" Crusher Plants and Equip.
KOEHRING Pavers, Mixers, Cranes, Dumptor, Mud-Jacks, Shovels
RAMSEY Hoists and Winches
CHICAGO Pneumatic Compressors and Tools
McCORMICK-DEERING Industrial Tractors
KWIK-MIX Mixers
RIDDELL Power Grader
JOHNSON Batchers and Demountable Bins
TRACKSON Loaders and Cranes
BYERS Shovels and Cranes
VULCAN Steam and Gas Locomotives
LIDGERWOOD Hoists
SARGENT Snow Plows
METAL FORMS CORP.
ROSCO Trailers and Bituminous Distributors
WALTER Trucks
GORMAN-RUPP CO. Pumps
UNION IRON WORKS
BUFFALO-SPRINGFIELD Rollers
MASTER Vibrators
OWEN Buckets
BEACH Saws
CLEAVER-BROOKS Boilers
BUCYRUS-ERIE Scrapers and Bulldozers
BARCO Hammers

Member: Associated Equipment Distributors

WM. H. ZIEGLER CO., INC.

Minneapolis, St. Paul, Duluth, Crookston, Minn.

"CATERPILLAR" — Tractors, Engines, Road Machinery
LAPLANT-CHOATE—Bulldozers, Snow Plows, Dump Wagons
LeTOURNEAU—Dirt Moving, Road Equipment
KILLEFER—Road Rippers, Scrapers
ATHEY—Crawlers, Dump Wagons, Trailers
BUCYRUS-ERIE — Power Shovels, Cranes, Draglines
PIONEER—Crushers, Gravel Plants
REX—Mixers, Pavers, Mixer-Mixers, Pumps, Saw Rigs
BUTLER—Bins, Batchers
BARBER-GREENE — Conveyors, Loaders, Ditchers
F. W. D.—Four-Wheel Drive Trucks
PLYMOUTH—Locomotives
GARDNER-DENVER — Air Compressors, Drills
LESCHEN—Wire Rope
LITTLEFORD — Oil Distributors, Tar Kettles, Heaters
"WILLIAMS" — Buckets, Heavy-Duty Trailers
HYPRESSURE JENNY—Spray Cleaners
MADSEN—Asphalt Plants

Member: Associated Equipment Distributors

BUBLITZ MACHINERY CO.

2305 Pennway, Kansas City, Mo.

Representing

Austin-Western Rd. Machy. Co.
Cleveland Tractor Co.
Jaeger Machine Co.
Lakewood Engineering Co.
Thew Shovel Co.
Barber-Greene Company
McKiernan-Terry Corp.
Whitcomb Locomotive Co.
Butler Bin Co.
"Williams"—Buckets and Trailers
Ames Baldwin Wyoming Co.
Red Star Products Co.
Sasgen Derrick Co.
Schramm, Inc.
Electric Tamper & Equipment Co.
MacMillan Petroleum Corp.
Bethlehem Steel Co. (Williamsport Div.)

Member: Associated Equipment Distributors

O. B. AVERY COMPANY

1325 Macklind Avenue St. Louis, Mo.

Exclusive Distributors of

AUSTIN Trenchers
HERCULES Rollers
BLAW-KNOX Bins, Buckets, Finishers, Forms
BRODERICK & BASCOM Wire Rope
CHAIN BELT Mixers, Pavers, Pumps
DEMPSTER Dumpsters
LaCROSSE Trailers
KEWANEE Conveyors
KOB Sprayers
LAMBERT-NATIONAL Hoists
McKIERNAN-TERRY Pile Hammers
NORTHWEST Shovels, Cranes & Draglines
PIERCE Rollers
R-B Subgraders
CEDAR RAPIDS Crushers
STANDARD Bituminous Distributors
SULLIVAN Compressors & Air Tools
VULCAN Locomotives

Member: Associated Equipment Distributors

CORBY SUPPLY COMPANY

3942-46 W. Pine Blvd., St. Louis, Mo.

Representing

AMERICAN—Flexible Metal Hose
BUHL CO.—Portable Air Compressors
CHAMPION RIVET CO.—Rivets and Welding Rod
DETROIT HOIST & MACH. CO.—Air and Electric Hoists
DeVILBISS CO.—Paint Spray Equipment
HARDSOCG WONDER DRILL CO.—Rock Drills and Paving Breakers
WM. H. KELLER, INC.—Buner Pneumatic Tools
MUNSELL—Air-Operated Concrete Vibrators
PANGBORN CORP.—Sandblast Equipment
PENNSYLVANIA—Air Compressors and Pumps
DAVID ROUND & SON—Chain Hoists
STAYNEW—Air and Pipeline Filters
N. A. STRAND & CO.—Flexible Shaft Equipment
VAN DORN—Electric Drills, Grinders and Buffers
VICTOR—Welding and Cutting Apparatus
WESTINGHOUSE—Arc Welding Equipment
GUSTAV WIEDEKE CO.—Tube Expanders

JOHN FABICK TRACTOR CO.

Gravois & Iowa Aves. St. Louis, Mo.

Representing

Athey Truss Wheel Co.
Wellman Engineering Co.
Buffalo-Springfield Roller Co.
Caterpillar Tractor Co.
Killefer Mfg. Co.
LaPlant-Choate Mfg. Co.
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Thew Shovel Company
Willamette-Hyster Co.
R. G. LeTourneau, Inc.
Ramsey Machinery Co.

Member: Associated Equipment Distributors

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Toledo Pressed Steel Co.
Contractors Machinery Corp.
Orr & Sembower, Inc.
Construction Machy. Co.
Fairbanks, Morse & Co.
Ames Baldwin Wyoming Shovel Co.
Aeroil Burner Co.
C. H. & E. Mfg. Co.
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Page Engineering Co.
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Slusser-McLean Co.
Trackson Co.

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Cleaver-Brooks Co.
Drave-Doyle Co.
Fairbanks, Morse & Co.
Good Roads Machinery Corp.
Frank G. Hough Co.
Huber Mfg. Co.
Insley Mfg. Co.
Koehring Co.
Kwik-Mix Concrete Mixer Co.
Lidgerwood Mfg. Co.
Master Vibrator Co.
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Rosco Mfg. Co.
Sterling Machinery Corp.
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Hauck—Heaters
Sasgen—Derricks & Winches
Skilsaw—Electric Saws, Drills
Skelton—Shovels
LeRoi—Engines
Symons—Column Clamps
Winslow—Weighing Scales
Universal—Form Clamps
Link-Belt—Cranes, Shovels, Draglines
Novo—Pumps
Vulcan—Steam and Drop Hammers
Waukesha—Engines
Mall—Vibrators and Grinders
Archer—Tower Equipment
Red Star—Wheelbarrows and Shores
Templeton, Kenly & Co.—Trench Braces, Jacks
Smith—Mixers, Pavers
Vail—Tie Wires and Tools
American Steel & Wire—Rope
Ramsey—Winches

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CONTRACTORS AND ENGINEERS MONTHLY
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Box 1112 Great Falls, Mont.

Complete Line of Road Machinery and Contractors' Equipment

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PIONEER Gravel Equip.
KOEHRING Mixers, Pavers, Shovels
INSLEY Conc. Towers
PARSONS Ditchers
PANTHER Oil, Grease
COLEMAN Trucks
GORMAN-RUPP Pumps
OWEN Buckets
SCHRAMM Compressors
MacWHYTE Rope
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Steel Bridges and Traffic Treads, Fresnos, Plows, Scrapers, etc.

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Sale *Rent*

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Jaeger Mixers
Self-Priming Pumps
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Expansion Joint
Screw Jacks
Air Compressors
Grass Mowers
Aeroil Torches & Kettles
Reinforcing Rods
Cement Waterproofing
Galvanized Rods and Bolts
Iron and Wood Blocks
Heavy Hardware

DALE & RANKIN, INC.

113 Frelinghuysen Ave., Newark, N. J.

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REX Mixers and Pavers
REX Pumps
LINK-BELT Cranes and Shovels
HELTZEL Road Forms and Bins
CHAMPION Sewer Cleaning Machines
INGERSOLL-RAND Compressors and Tools
HANSON Cranes & Excavating Equip.
HANSON Heavy-Duty Trailers
VIBER Elec. & Pneu. Concrete Vibrators
WALSH Snow Plows
AEROIL Heaters and Tools
WINSLOW Scales
UNIVERSAL Concrete Accessories
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ALEMITE Guns and Fittings

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ALLIS-CHALMERS Tractors, Graders & Power Units
BAKER Bulldozers & Gradebuilders
JOHNSON Steel Bins and Batchers
ERIE Gasoline Rollers
MARLOW Centrifugal, Diaphragm and Plunger Pumps
RED STAR Wheelbarrows, Batch Boxes, Column Clamps and Adjustable Shores
OSGOOD Shovels, Cranes and Draglines
GENERAL Shovels, Cranes and Draglines
HOTCHKISS Road and Sidewalk Forms
VIBRO-CAST & JACKSON Concrete Vibrators and Elec. Power Plants
AMERICAN Snow Plows

CONTRACTORS SALES CO., INC.

P. O. Box 949 Albany, N.Y.

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Jaeger Machine Co.
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Ingersoll-Rand Co.
The Osgood Co.
Baker Mfg. Co., Inc.
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Hercules Roller Co.
Hough Universal Sweepers
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Sometimes in the rush of moving to a new location you fail to send us your new address. And as we are anxious to get your copy of the magazine to you on time do not put off writing us. Thank you.

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Quick-Way Truck Shovels
Ross Snow Plows

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116 John Street Horseheads, N. Y.

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ARMCO—Culverts
A-W—Traffic Tread
BAKER—Road Drags, Snow Plows, Bulldozers
C.M.C.—Wonder & Marsh-Capron Mixers
DIAMOND—Crushers, Conveyors, Screening & Washing Equip.
HUBER—Rollers
HOTCHKISS—Sidewalk Forms
JACKSON—Wheelbarrows
LANSING—Wheelbarrows
MILES—Concrete Block Machines
ROWE—Can't Drift Snow Fence
SWEET'S—Steel Posts
THEW-LORAIN—Shovels, Cranes
UNIVERSAL-LORAIN—Shovels, Trailers
WORTHINGTON—Compressors
WILLIAMSPORT—Wire Rope
WISCONSIN SPECIAL—Snow Plows

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Overhead Tractor Shovel Co.
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Killefer Mfg. Co.
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KADCO CORP.—Dust Control Equipment
MARLOW—Self-priming Centrifugal & Plunger Pumps
MALL TOOL CO.—Concrete Vibrators
McKIERNAN-TERRY CORP.—Pile Hammers
KOEHRING CO.—Concrete Mixers
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Long Island Distributors:

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"SILVER KING" Tractors
ADAMS Graders
SARGENT Snow Plows
LOCKE Power Mowers
EUCLID Scrapers
OLIVER Implements
BRODERICK & BASCOM Wire Rope
WORTHINGTON Power Mowers

Also Pumps, Mixers

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"Serving the Contractor for over 25 years"

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Beach Mfg. Co.—Saw Rigs
Blaw-Knox Co.—Road and Sidewalk Forms, Bins, Batchers, Finishing Machines, Spreaders, Buckets
Cleaver-Brooks Co.—Tank Car Heaters, Boosters
Gorman-Rupp Co.—Pumps
Hug Co.—Trucks
Insley Mfg. Co.—Excavators, Concrete Chuting Plants, Buckets, Cars
Koehring Company—Pavers, Mixers, Shovels, Cranes, Mud Jacks
Kwik-Mix Mfg. Co.—Conc. Mixers
Master Vibrator Co.—Conc. Vibrators
Parsons Co.—Trench Machines
Pioneer Gravel Equipment
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CURRY Wire Ties
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Complete Line of Contractors' Equipment and Supplies.

217 Pearl Street New York, N.Y.

Representing

Riddell Graders
Richmond Tyscrus, Anchors
Ingersoll-Rand Air Compressors, Rock Drills, Pneumatic Tools.
Gas, Electric, Pneumatic Concrete Vibrators
Pumps of all descriptions
Hotchkiss Road & Sidewalk Forms
Lansing Concrete, Mortar Mixers
Vulcan Pile Hammers, Extractors, Parts
Wiley Concrete Buckets
Temple Road Material Spreaders

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LaPLANT-CHOATE MFG. CO.
ATHEY TRUSS WHEEL CO.
R. G. LeTOURNEAU, INC.
MARION Shovels, ¾-2 yds.
SPEEDER Shovels, ½-⅝ yd.
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SMITH Mixers, Pavers
LeROI Compressors, Engines
HELTZEL Steel Bins, Forms
FRINK Snow Plows
MARLOW Pumps
KIESLER Buckets

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165 Locust Avenue
NEW YORK, N. Y.

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Construction Machy. Co.—Concrete, Plaster & Mortar Mixers, Saw Rigs, Pumps, Hoists and Pneumatic Tired Concrete Carts
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Portable Machy. Co.—Portable and Stationary Belt Conveyors
Sterling Mfg. Co.—Wheelbarrows & Concrete Carts
Sullivan Machy. Co.—Compressors, Pneumatic Tools and Accessories
White Mfg. Co.—Concrete Vibrators, Grinders and Heaters

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Warehouse 358 W. Jefferson St.

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Gorman-Rupp Co.
Goulds Pumps, Inc.
Hazard Wire Rope Co.
Ingersoll-Rand Co.
Johns-Manville (Bridge Plank)
Killefer Mfg. Co.
Koehring Co.
LaPlant-Choate Mfg. Co.
Insley Mfg. Co.
Parsons Co.
Universal Form Clamp Co.
Wickwire Spencer Steel Corp.
Williamsport Wire Rope
Timken Roller Bearing Service & Sales Co.—Timken Bits & Rods
Iowa Mfg. Co.
R. G. LeTourneau, Inc.
Master Vibrator Co.
Hauck Heaters
Speeder Machinery Corp.

Member: Associated Equipment Distributors

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American Cable Company
Buckeye Traction Ditcher Company
Bucyrus-Erie Tractor Eq.
Cleaver-Brooks Company
Cleveland Rock Drill Co.
DeWalt Products Corp.
Eagle Crusher Co., Inc.
Elgin Sweeper Co.
Euclid Road Machy. Co.
Fairbanks, Morse & Co.
Fairfield Engrg. Co.
Four Wh. Dr. Auto Co.
Galion Allsteel Body Co.
Galion Iron Wks. & Mfg. Co.
Good Roads Mach. Corp.
Heltzel Steel Form & Iron Company
Highway Trailer Co.
Frank G. Hough Co.
International Harvester Co.
Iowa Manufacturing Co.
Jaeger Machine Company
Jeffrey Manufacturing Co.
The C. S. Johnson Co.
Kensington Steel Company
Jos. F. Klein & Company
Lakewood Engineering Co.
Page Engineering Company
Ingersoll-Rand Company
Wellman Engineering Co.

Member: Associated Equipment Distributors

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CATERPILLAR Tractors, Graders, Power Units
THEW Shovels, Cranes
LeTOURNEAU Carry-all Scrapers
BLAW-KNOX Steel Forms, Bins, Buckets, Trukmixers
LaPLANT-CHOATE Wagons, Bulldozers
DIAMOND Rock Jaw Crushers
BARBER-GREENE Conveyors, Car Unloaders
LaCROSSE Trailers
ETNYRE Bituminous Distributors, Flushers
WONDER Mixers, Hoists
GARDNER-DENVER Air Compressors, Drills
SLUSSER-MacLEAN Wheelers, Bippers, Fresnos
GORMAN-RUPP Centrifugal Pumps
HERCULES Road Rollers

Member: Associated Equipment Distributors

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THE EUCLID ROAD MACHY. CO.—Crawler Wagons, Scrapers, Bulldozers
THE ISAACSON IRON WORKS—Power Scrapers, Trailbuilders
MAIN STEEL PRODUCTS CO.—Snow Plows
MEAD MORRISON—Winches
THE TRUCK ENGINEERING CORP.
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470 Fourth Avenue New York

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3088 West 106th St., Cleveland, Ohio. Tel. Clearwater 4400

Allis-Chalmers—Tractors
Anthony—Dump Bodies
Baker Mfg. Co.—Bulldozers
Broderick & Bascom—Wire Rope
Wm. Bros Mfg. Co.—Tamping Rollers
Cleveland Rock Drill Co.—Air Tools
Construction Machy. Co.—Mixers
Continental—Scrapers
Foote Company—Pavers
Gar Wood—Scrapers
General Excavator Co.—Shovels
Hough—Loaders
Iowa Mfg. Co.—Crushers
The C. S. Johnson Co.
McKiernan-Terry Corp.—Pile Hammers
Michigan—Power Shovels
Novo Engine Co.—Engines, Light Plants, Pumps
R-B Equipment Co.—Pinegraders
Ross Mfg. Co.—Distributors & Oilers
Schramm, Inc.—Air Compressors
Tonkin—Bits
Wellman Engineering Co.—"Williams" Buckets
White Mfg. Co.—Asphalt Plants, Tar Kettles, Kerosene Torches, Vibrators

Member: Associated Equipment Distributors

SOUTHERN OHIO EQUIP. CO

169-171 W. Main St., Zanesville, Ohio

On Route 40

Phone 813

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Iowa Mfg. Co.
General Excavator Co.
Schramm, Inc.
Cleveland Rock Drill Co.
Timken Roller Bearing Co.
D-A Lubricant Co.
Shunk Mfg. Co.
Apollo Culvert Works
Slusser-McLean Co.
Williamsport Wire Rope

CLYDE EQUIPMENT CO.

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Blaw-Knox & Western Pipe Corp.
Clyde Iron Works
Lincoln Electric Co.
Busyrus-Erie Co.
Geo. Haiss Mfg. Co., Inc.
Sauerman Brothers
Sullivan Machinery Co.
Klauer Mfg. Company
T. L. Smith Co.
Allis-Chalmers Mfg. Co.
LaRoi Company
Beebe Bros.
Kohler Co.
Wm. Bros Boiler & Mfg. Co.
Smith Engineering Works

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Cleaver-Brooks Co.
Busyrus-Erie Co.
The Jaeger Machine Co.
Nordberg Mfg. Co. (Symons Crushers)
McKiernan-Terry Corp.
Schramm, Inc. (Compressors)
Universal Power Shovel Co.
Speeder Machinery Corp.
Elgin Corp.
Good Roads Machy. Corp. ((Crushers & Snow Plows)
Buda Co. (Diesel & Gas. Eng.)
Baker Mfg. Co.
Walter Motor Truck Co.
Seagrave Corp.
B. F. Goodrich Rubber Co. (Fire Hose)
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HOISTS—SCRAPERS—WIRE ROPE
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Adnun Black Top Pavers
Heltzel Steel Forms, Bins
R-B Finegrader
Heltzel Finishing Mach.
Marsh Capron Mixers
Wonder Concrete Mixers
Marlow Centrifugal Pumps
Marlow Diaphragm Pumps
Chrysler Portable Air Compressors
New Haven Burlapped-Cotton Blankets
Hayward Clamshell Buckets
Huber Rollers
Archer Towers, Buckets
LaCrosse Tu-way Trailers
Burch Stone Spreaders
Sasgen Derricks, etc.
Flory Hoists
R-B Power Subgrader
Miles Block Machines
Pulsometer Steam Pumps
Bay City Truck Cranes
Tru-Lay Steel Cable
Reynolds Constr. Furnaces
Jaekson Wheelbarrows, etc.

GILES & RANSOME

17th St. & Sedgley Ave., Philadelphia

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Ransome Concrete Machinery Co.—Concrete Mixers and Appliances
Northwest Engineering Co.—Gasoline Cranes, Shovels and Draglines
Blaw-Knox Co.—Clamshell Buckets, Road Forms, Material and Cement Bins
Ord—Road Finishing Machine
R. G. LeTourneau, Inc.—Carryalls, Buggies
The Barnes Mfg. Co.—Centrifugal Diaphragm and Force Pumps
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Davey—Air Compressors
Richmond Screw Anchor Co.—Form Ties
Master—Elec., Gas. Concrete Vibrators

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Galion Iron Works & Mfg. Co.
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Quick-Way Truck Shovel Mfg. Co.
Insley Mfg. Co.
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Truck Cranes

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Chicago Pneumatic Tool Co.—Compressors, Air Tools
Drave Doyle Co.—Tubular Hoisting Towers
Hercules Company—Road Rollers
Cleaver-Brooks Co.—Concr. Handling Machy., Excavators
Internat'l Harvester Co.—Indus. Wheeltype and Crawler Tractors
C. S. Johnson & Co.—Bins, Batchers, Cement Handl. Eq.
Littleford Bros.—Road Oil Distrs., Heating Kettles, etc.
McKiernan-Terry Corp.—Pile Hammers, Hoists
Nelson Iron Works—Loaders and Belt Conveyors
The Parsons Company—Trench Machines, Snow Plows
W. A. Riddell Corp.—Power Graders

Member: Associated Equipment Distributors

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1744—Sedgley Avenue—1744
PHILADELPHIA

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Baker Mfg. Co.—Bulldozers Blade & V Type Snow Plows
C. H. & E. Mfg. Co.—Saw Rigs, Rollers, Hoists
Chain Belt Co.—Concr. Truck Mixers, Pavers, Glass Mixers, Pumps, Pumpcrete
Clyde Iron Works—Gas, Elec., Steam Hoists
Concrete Surfacing Machinery Co.—Berg Surfacers
Gar Wood—Scrapers, Bulldozers
Ingersoll-Rand Co.—Air Compressors, Pneumatic Tools
Iowa Mfg. Co.—Crushers, Conveyors & Asphalt Plants
Lima Locomotive Wks.—Shovels, Cranes, Draglines
Richmond Screw Anchor Co.—Form ties
John A. Roebling's Sons Co.—Wire rope, Fittings
Sasgen Derrick Co.—Derricks and Winches
Shannon—Derricks and Derrick Fittings
Speeder Mach. Co.—Shovels, Cranes

Member: Associated Equipment Distributors

WESTERN MATERIAL CO.

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Balderson Snow Plows
Barber-Greene Ditchers, Loaders
Bates Wire Ties
Busyrus-Erie "Loadmaster"
Butler Bins, Hoppers
Philip Carey Exp. Joints
"Caterpillar" Equipment
Chain Belt Pump, Mixers
Clyde Sales Hoists
D-A Lubricants
Davey Compressors
Day Crushers
Harris "Russell" Road Equip.
Hester Fireline Plows
LaPlant-Choate Tractor Eq.
LeTourneau Dirt-moving Eq.
Littleford Heating Equip.
Manhattan Belting
Pioneer Crushing Plants
Slusser-McLean Scrapers, Fresnos
Stella Stone Spreaders
Tore Mowers
Walter Motor Trucks
Willamette-Hyster Winches, Hysters
Athey Wagons
John Deere Indus. Tractors
Killefer Fresnos, Scrapers
Coffing Hoists
Rotary Snow Plows
Highway Trailer Earth Boring Mach.
Wirth Dieselectric Plants

Member: Associated Equipment Distributors

NIXON-HASSELLE COMPANY INC.

Contractors' Equipment
Chattanooga Tennessee

Representing

BLAW-KNOX Buckets, Forms
INGERSOLL-RAND Compressors, Jackhammers
MUNDY Hoists
AUSTIN-WESTERN Graders, Crushers, Rollers, etc.
BARBER-GREENE Loaders, Conveyors
NORTHWEST Cranes, Shovels
ARCHER Towers, Spouting Equipment
REX Mixers, Pavers, Pumps
CLETRAC Tractors
NEWPORT Culvert Pipe
VULCAN Gas. Locomotives
JAHN Machy. Trailers
DOBBIE Derricks
HOUGH—"Universal" Road Sweeper
LIDGERWOOD Hoists
SYNTRON Hammers, Vibr.
EAGLE Crushers & Pulv.
FOUR WH. DRIVE Trucks
TIMKEN Detach. Bits
Also Wheelbarrows, Carts, Benders, Cutters, Shovels, etc.

Member: Associated Equipment Distributors

BROOKS EQUIP. & MFG. CO.

Knoxville 408 Davenport Rd. Tennessee

Representing

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Busyrus-Erie Co.
Continental Roll & Steel Co.
Crucible Steel Co.
Drave-Doyle Co.
Foote Co., Inc.
Gardner-Denver Co.
Heltzel Steel Form & Iron Co.
Cincinnati Rubber Mfg. Co.
Hug Co.
Independent Pneu. Tool Co.
Jaeger Machine Co.
C. S. Johnson Co.
Linn Mfg. Corp.
Master Vibrator Co.
McKiernan-Terry Corp.
Owen Bucket Co.
Pioneer Gravel Eq. Mfg. Co.
Rosco Mfg. Co.

Member: Associated Equipment Distributors

WILSON-WEESNER-WILKINSON CO.

Nashville Tennessee

Representing

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Insley Mfg. Co.
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
Gorman-Rupp Co.
The Parsons Co.
Ingersoll-Rand Co.
Littleford Bros.
Smith Engineering Works
Amon Baldwin Wyoming Co.
Baker Mfg. Co.
Cleaver-Brooks Co.
Clyde Sales Co.
E. D. Etnyre Co., Inc.

NASHVILLE—KNOXVILLE
Warehouse Stocks of Service
Reinforcing Steel and Mesh

Member: Associated Equipment Distributors

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205 Exposition Ave. Dallas, Texas
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Representing

Buckeye Traction Ditcher Company
Foote Company—Pavers
Galion Iron Works & Mfg. Co.
Ingersoll-Rand Company
International Tractors
Iowa Mfg. Co.—Cedar Rapids Line
Jaeger Machine Company
Jones Superior Mach. Co.
Lidgerwood Mfg. Co.
Littleford Brothers
The Owen Bucket Company
Sterling Wheelbarrow Co.
Thew Shovel Company
Trackson Company
Page Engineering Co.

Member: Associated Equipment Distributors

R. B. EVERETT & CO.

3112-18 Harrisburg Blvd. Houston, Texas

BLAW-KNOX Road Plant Equipment, Bins, Clam Shell Buckets
AMERICAN Hoisting Machinery
"P. & H." Gasoline Cranes
McKIERNAN-TERRY Pile Hammers, etc.
CONNERY Asphalt Equip.
CHAIN BELT Concrete Mix ers, Saw Rigs, Pavers
NOVO Engines, Hoists, Pumps
"RED STAR" Wheelbarrows
SAUERMAN Cableways
BATES Wire Ties
PULSOMETER & NYE Steam Pumps
PATENT Safety Swinging Scaffolding
TRU-LAY Wire Rope
BUFFALO-SPRINGFIELD Road Builders
SULLIVAN Compressors
PORTABLE Conveyors
ETNYRE Asphalt Distrs.
FLYNN Surgrader
PAGE Dragline Buckets
MALL Vibrators

Member: Associated Equipment Distributors

PHILLIPS MACHINERY CO.

900 East Cary St. Richmond, Va.

Representing

Austin Machinery Corp.
Butler Bin Company
Clyde Sales Co.
Chicago Automatic Conveyor Co.
DeWalt Products Corp.
Jackson Mfg. Co.
Sauerman Brothers, Inc.
Chicago Pneumatic Tool Co.
Stephens-Adamson Mfg. Co.
Rogers Brothers Corp.
General Excavator Co.
Aeroil Burner Co.
Manitowoc Engineering Works
Broderick & Bascom Rope Co.
Chain Belt Company
Van Dorn Electric Tool Co.
Master Vibrator Company

Member: Associated Equipment Distributors

WE WOULD LIKE TO HAVE YOU HELP US

keep this Directory of Dealers in construction equipment up to date. Therefore, we would greatly appreciate any suggestions or corrections that you may have to offer.

CONTRACTORS AND ENGINEERS MONTHLY

470 Fourth Ave. New York

CONSTRUCTION EQUIPMENT CO.

1118-1124 Ide Ave., Spokane, Wash.

Aeroil Burner Co., Inc.
American Hoist & Derr. Co.
Archer Iron Works
Bates Wire Ties
Beebe Bros.
Blystone Mfg. Co.
Broderick & Bascom Rope
Buffalo-Springfld. Roller Co.
Butler Bin Co.
Chain Belt Co.
Climax Eng. Co.
Concrete Surf. Machy. Co.
D-A Lubricant Co.
Detroit Graphite Co.
R. E. Dietz Co.
Duff-Norton Mfg. Co.
Fairbanks, Morse & Co.
Fate-Root-Heath Co.
Homestead Valve Mfg. Co.
Iowa Mfg. Co.
Kalamazoo Ry. Supply Co.
LaRoi Co.
Linde Air Products Co.
M. & M. Wire Clamp Co.
Mall Tool Co.
Niagara Mfg. Co.
Red Star Products Co.
Sasgen Derrick Co.
Sheldon Mfg. Co.
Sterling Machinery Corp.
Sterling Wheelbarrow Co.
Sullivan Machinery Co.
Sunbeam Mfg. Co.
Templeton, Kenly & Co.
Thew Shovel Co.
Willamette Hyster Co.
"Williams" Buckets, etc.
Young Iron Works

Member: Associated Equipment Distributors

BOEHCK EQUIPMENT CO.

2404 W. Clybourn St. Milwaukee, Wis.

Representing

Jaeger Machine Co.
Byers Machine Co.
LaRoi Co.
A. Leschen & Sons Rope Co.
Wellman Engineering Co.
C. S. Johnson Company
Corrugated Steel Sheet Piling Corp.
McKiernan-Terry Corp.
Homestead Valve Mfg. Co.
Sasgen Derrick Co.
American Hoist & Derrick Co.
Jones-Superior Machine Co.
Construction Accessories, Inc.
Independent Pneumatic Tool Co.
Hercules St. Products Co.
Electric Tam. & Equip. Co.
Portable Machinery Company
Hauck Mfg. Company
Lima Locomotive Works
Red Star Products, Inc.

Member: Associated Equipment Distributors

DROTT TRACTOR CO., Inc.

3841 W. Wisconsin Ave.
Milwaukee Wisconsin

Representing

ALLIS-CHALMERS Tractors, Graders, Speed Patrols, Hauling and Power Units
OSHKOSH 4-wheel Drive Trucks
PIONEER Gravel Equipment
WAUSAU Snow Plows
DROTT Bulldozers, Scrapers, Scarifiers, Hydraulic Equipment, etc.
LaCROSSE Trailers
KOB Sand Spreaders
HERCULES Road Rollers
DAVEY Air Compressors
RUSSELL Scrapers, Plows
CONTINENTAL Dirt-Moving Scrapers
HOUGH Loaders, Sweepers
CUMMINS Diesel Engines
JOY Snow Loaders
BUTLER Sand Spreaders
WILLETT Truck-Grader
GAR WOOD Dirt Moving Scrapers

Member: Associated Equipment Distributors

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Sometimes in the rush of moving to a new location you fail to send us your new address. And as we are anxious to get your copy of the magazine to you on time do not put off writing us. Thank you.

CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Avenue, New York

Contractors and Engineers Monthly

C. & E. M. Photo

The "Morning After" Cure. Applying Sodium Silicate on Barber Bros. 10.2-Mile Concrete Job at Lafayette, La., Where Careful Planning Cut Lost Time to a Minimum. See Page 1.

C. & E. M. Photo

Fourteen Tons of Compaction on Three Fixed Axles Rolled the Surface Courses on the Iafolla-McCourt Two-Course Cold Mix on Waterbound Base Paving Job Near Peterborough, N.H. See Page 18.

C. & E. M. Photo

Going Fishing? No, Just Moving Again. This Bucyrus-Erie Moved Under Its Own Power Back and Forth Across the River on Carlo Bianchi's Bridge Job at Bennington, Vt. See Page 2.

C. & E. M. Photo

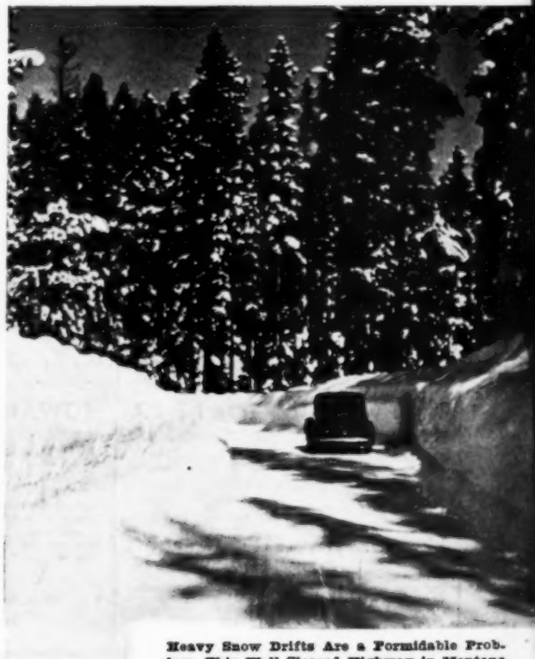
Early Fall Overhauling of Snow Plows, Snow Fence and Sanders in the Yard at the Dutchess County, N.Y., Garage Is an Important Part of This County's Well-Organized Program of Snow Removal. See Page 2.

Erie County, N. Y., Has Plenty of Snow to Handle During the Winter Months. Above Is an International 7½-Ton Truck with V-Plow Clearing a Highway

A Portable Vulcanizer Made Eight Belts into One Continuous 2-Mile Conveyor to Handle Aggregate for the Construction of the High Dam at Grand Coulee. See Page 1.

Tandem Scraper Outfits Speed a Cut and Fill on Crow Brothers' Contract for the Galican Overhead Project on State Highway 101 in Southern California. See Page 10.

Three Important Machines Used by Froemming-Kies on the Galveston Causeway Approach in Texas—a Flex-Plane Panama-Type Finishing Machine, the Joint-Installing Machine, and the Contractor's Own Traffic-Line Placing Machine. See Page 32.



Heavy Snow Drifts Are a Formidable Problem. This Well-Cleared Highway in Montana Shows How That State Handles Such Difficulties. See Page 7.